

# ENERGIC Plus<sup>®</sup>

## BATTERY CHARGERS & MAINTENANCE



ENERGIC Plus<sup>®</sup>

IN CHARGE OF YOUR BATTERIES

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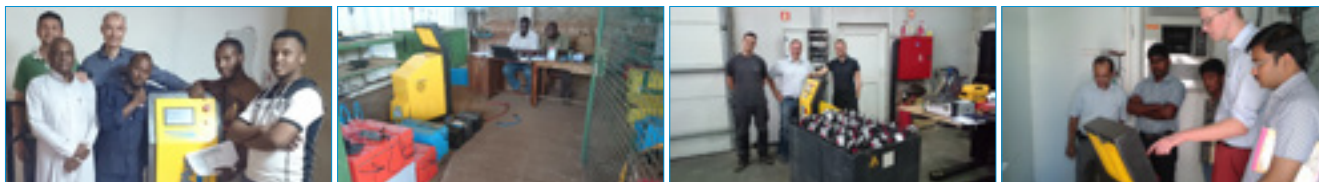
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## **INTRODUCTION ENERGIC PLUS<sup>®</sup>** .....

The **Energic Plus<sup>®</sup>** name is synonymous with quality, innovation and durability in power electronics for battery-operated systems.

Energic Plus<sup>®</sup> has had a **long-lasting and successful worldwide presence** in the **energy storage and power supply sectors** for more than 10 years now. With more than 10 000 happy and returning customers on all continents, we are one of the leading suppliers of battery charge equipment on today's market.

In terms of battery regeneration and diagnostics equipment, Energic Plus<sup>®</sup> has become the market leader **with currently over 500 happy and returning customers!**



### **PRODUCTS**

With a range of **more than 400 different chargers**, Energic Plus<sup>®</sup> offers an extensive variety of industrial battery chargers that are well-known for their excellent reliability. In addition to the **HF chargers and chargers for traction batteries**, we also offer you **battery accessories** such as measuring equipment, safety kits and connectors. In combination with large stock, Energic Plus<sup>®</sup> is your answer to all battery-related needs!

Our showpiece is the **Energic Replus battery regenerator**, which can give any lead-acid battery a second life. Regeneration is very popular, because 80% of the batteries breaking down and losing capacity are sulphated and can be restored with the right equipment. Sulphation of the internal plates increases the resistance within the battery, making it impossible for the battery to work to its full potential. Our Energic Plus<sup>®</sup> regenerator successfully removes sulphation by applying a very high frequency pulse in several steps. This process restores battery capacity, giving you the ability to reuse old and sulphated batteries. Our equipment can also be used for annual maintenance which can double the lifespan of your batteries.

Not only the Energic Plus<sup>®</sup> battery regenerator restores the capacity of your batteries, it is also the perfect battery analyzer. Since we have a complete load bank built into this device, we can perform a complete load test to check the current capacity of your battery. And we even go one step further: if you use the battery regenerator in combination with our BMS system, you can even easily detect bad cells in your battery bank! So stop wasting time: as of now the Energic Plus<sup>®</sup> product range makes battery analyzing and restoring a piece of cake!

## **STAY INFORMED OF ENERGIC PLUS<sup>®</sup>** .....

Go to downloads on [www.energicplus.com](http://www.energicplus.com) to view our complete range. For more information, contact us on [info@energicplus.com](mailto:info@energicplus.com).



Energic Plus<sup>®</sup> has a Facebook account featuring new products, product innovations, trade fair participations, movies ... Like the Energic Plus<sup>®</sup> page on [www.facebook.com/energicplus](http://www.facebook.com/energicplus).



We also share Energic Plus<sup>®</sup> news on LinkedIn, see [www.linkedin.com/company/energic-plus](http://www.linkedin.com/company/energic-plus).



## **CUSTOM-MADE SOLUTIONS** .....

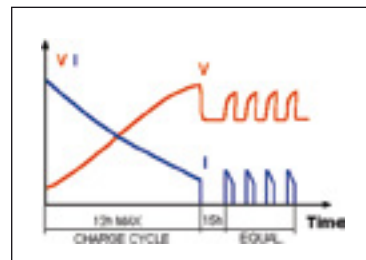
We gladly assemble the perfect battery maintenance package for your working environment. Contact us via [info@energicplus.com](mailto:info@energicplus.com) for more information.

## TRACTION BATTERY CHARGERS .....

### 1. What is **EQUALIZATION** and how does it work?

When a battery is new, all the cells are virtually in the same condition. After the first cycle of charge-discharge, you can already measure small tension differences between the cells. These small differences between cells are more and more emphasized in the next charge-discharge cycles. This process reduces the performance of the battery and its lifespan.

The **equalization** function, offered on all Energic Plus® chargers, has been developed to keep all the cells of the battery at the same level, even after years of continuous work. The equalization function consists of 4 short extra charge cycles once the normal charge of the battery is completed. In the diagram of our chargers (see picture), it is possible to see the 4 equalization charges.



### ADVANTAGES

- Improved battery performance
- Extended battery lifespan

### 2. What is **MAINTENANCE** and how does it work?

If a battery is not used for a long time (for example: seasonal work, holiday periods), it must be kept fully charged, in order to avoid a fall in performance. Then it is important **to charge the battery prior to leaving it in stock for more than 24 hours.**

Another problem is present in all batteries: the **auto-discharge** process. This makes it harder to keep a battery charged when the time in stock is longer (weeks or months).

The **maintenance** performed by our digital chargers, keeps the battery in perfect condition when it is not used for an indefinite time. It is sufficient to leave the battery connected to the charger and maintenance will be done automatically.

Our ARD-charger constantly monitors the battery voltage and maintains it between 2,25 and 2,37 V/cell, so the maintenance timing is "controlled" by the battery.

### THE MOST IMPORTANT ADVANTAGES OF AR-DIGITAL CHARGERS ARE

- **Derivative dV/dT final charge**
  - The charge time is completely defined by the battery conditions.
  - The risk of overheating in the battery is eliminated.
  - The risk of insufficient charge is eliminated.
  - The charger stops when the battery is fully charged.
- **Digital display with advanced information**

The display continuously shows the charge parameters (current, capacity charged, effective time of charge, V/cell). The display shows special messages in case of emergency stop, errors or black-out to help the operation of troubleshooting (see user's manual). The parameters "capacity charged" and "effective time of charge" are required to enable complete control of the battery performance, especially when it is necessary to find the cause of a low autonomy of the forklift.

## FAST CHARGER (WOWA) .....

### SPECIFICATIONS

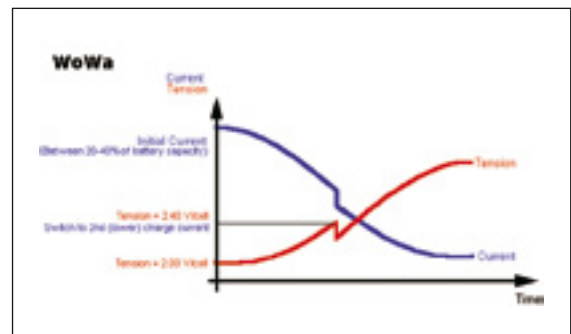
The WoWa charge system, described by the norm DIN41773, is used when it's necessary to reduce the time of charge. It is an evolution of the Wa charge system.

To reduce the time of charge, the WoWa system allows a higher charge current during the first phase of the charge. This higher current can be kept while the voltage of the battery is below the gassing point (2,4 V/cell).

When the voltage of the battery reaches the gassing point, the current is reduced to the value of the standard Wa system, to avoid useless and dangerous overheating of the battery.

The advantage of the WoWa system is that the battery is charged faster without the risk of damaging and/or overheating it.

The choice of the right WoWa charger can be made by taking in consideration the battery capacity and the time available to charge it. A common method is to choose a charger with a rated output current equal to 22% of the battery capacity in Ah.



## AIR PUMP – ONLY WITH FAST CHARGER (WOWA).....

The air pump chargers are made to charge batteries with an air circulation system. The fresh air pumped into the battery, while it is being charged, reduces the temperature and improves the mixing of the electrolyte chemical components. This results in a faster and safer charge cycle, because it's possible to charge the battery with a higher current (less time), without the risk of overheating.

It's possible to regulate the amount of fresh air pumped into the battery with an opposite manual valve, mounted inside the charger. This is important because the optimal amount of fresh air is different for batteries according to type, brand and capacity.

A pressure sensor has been added in order to detect any possible problem in the air circulation system (e.g.: air tubes are not connected or broken, air pump is broken). In case of problems, the charger reacts automatically:

- The charger curve is changed from the original WoWa to a less aggressive Wa.
- The time of charge is adjusted according to the real condition of the battery.



# BATTERY REGENERATION & MAINTENANCE

## **ENERGIC REPLUS BATTERY REGENERATOR .....**

Expand the lifespan of your batteries: restore your sulphated batteries by the electrical High-frequency pulsation process of the battery regenerator.

### **REGENERATE YOUR SULPHATED BATTERIES**

Battery regeneration is very popular. **80% of the batteries breaking down and losing capacity are sulphated, but can be restored with the right equipment.** Our Energic Replus battery regenerator successfully replaces sulphation by active material thanks to an electrical high-frequency pulsation process. This process restores the battery capacity, giving you the ability to reuse old and sulphated batteries. You can also use the battery regenerator for annual maintenance to considerably prolong the lifespan of your batteries. The battery regenerator can be used in every lead-acid-based battery: starter batteries, stationary batteries, traction & semi-traction batteries, Ni-Cad batteries ...

### **WHAT IS SULPHATION?**

During use, small sulphate crystals formed, but this is normal and not harmful. During prolonged charge deprivation however, the amorphous lead sulphate converts to a crystalline form that deposits on the negative plates. This leads to the development of large crystals, which reduce the battery's active material that is responsible for high capacity and low resistance. Sulphation also lowers the charge acceptance.

This lead sulphate increases internal resistance and decreases the specific gravity of the electrolyte. The process of sulphation build-up is unavoidable. Worse yet, after 3–4 years the process accelerates substantially.

Batteries sulphate due to a mix of reasons:

- The battery was inactive for too long
- The battery was discharged too deeply
- The wrong charger was used
- A bad cell was left untreated
- The battery has reached too high/low temperatures
- The charge cycles weren't observed

### **ADVANTAGES OF USING THE BATTERY REGENERATOR**



- Combination of battery discharger and battery charger, all combined into 1
- Detailed test reports
- Minimum maintenance cost
- Extended lifespan of batteries
- Quick regenerations
- Free analyzing software
- Automation program applied
- 18-month warranty
- CE-certified, MET-certified (US market)
- Wireless connection between regenerator and computer
- Possibility to monitor the regenerator process on smartphone or laptop (within local network)

## REGENERATION REPORTS

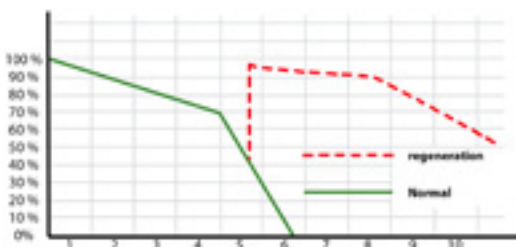
When you compare 1 & 4, you can see that the time needed to discharge the battery is much longer in step 4. This is a direct result of the restoration in mode 2 & 3. When comparing step 5 to step 2, you can see that the set battery voltage is reached much later than in step 2. This means that your battery lasts longer and has been restored to a good condition.

**This curve shows a complete restoration:**

1. Controlled discharge
2. Restoration
3. Restoration
4. Discharge
5. Restoration

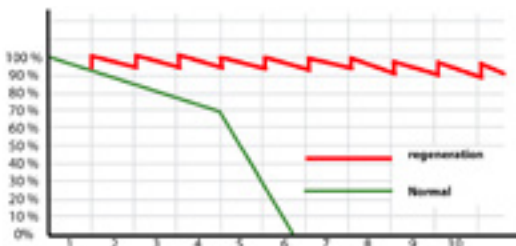


## 2 ways to use the battery regenerator



### Reconditioning regeneration

This allows you to restore old (5, 6, 7... years), medium to well-maintained batteries that have 'silted up' as a result of natural sulphation, to a 90–100% productivity.



### Maintenance regeneration

This allows you to keep your battery in optimal, sulphate-free condition, by means of a yearly short regeneration.

## OVERVIEW REPLUS MODELS



<b>Model</b>	<b><u>139TA1918</u></b>
Input power	AC 1PH, 220 V, 50/60 Hz
Output	1,2 V - 100 V - 0 A - 30 A
Battery capacity	300 Ah
Transformer	7,5 kW

<b>Model</b>	<b><u>138TA6595</u></b>
Input power	AC 3PH, 220 V or 380 V, 50/60 Hz
Output	1,2 V - 150 V - 0 A - 100 A
Battery capacity	1000 Ah
Transformer	20 kW

<b>Model</b>	<b><u>139TA1917</u></b>
Input power	AC 3PH, 220 V or 380 V, 50/60 Hz
Output	1,2 V - 120 V - 0 A - 50 A
Battery capacity	500 Ah
Transformer	10 kW

<b>Model</b>	<b><u>139TA5237</u></b>
Input power	AC 3PH, 220 V or 380 V, 50/60 Hz
Output	1,2 V - 75 V - 0 A - 300 A
Battery capacity	3000 Ah
Transformer	50 kW

If you want, you can change the composition of the kit and this can result in a cheaper solution for you. We gladly assemble the perfect battery maintenance package for your working environment. Contact us via [info@energicplus.com](mailto:info@energicplus.com) for more information.

## BMS SYSTEM: WIRELESS DETECTION OF BAD CELLS.....

Professional individual voltage measurements of all cells during a complete discharge **provide a perfect evaluation of the battery.** Ordinary capacity systems only display the total voltage and capacity of the battery, but never the results of the individual cell. With this BMS you get a clear overview of the performance of each cell, allowing you to make an exact evaluation.



### The BMS system offers:

- Duration test during the entire discharge process.
- Real-time monitoring.
- Analysis function by means of the supplied software.
- No tangled up wires thanks to the easy wireless connection.
- Crystal-clear overview of the battery capacity.
- Can be synched with the Replus regenerator.

The system consists of a number of voltage detectors that is equal to the number of cells. The sensors transfer the voltage of each cell wirelessly to the receiver (best to be performed during A COMPLETE discharge process). The receiver - connected to a PC - collects the data.

If you use this system in combination with our BDX battery discharger or battery regenerator Replus you will be able to detect the faulty element and increase the battery's capacity.

Thanks to the **software program** that is supplied with the sensors you can now easily detect which element is no longer keeping its charge and needs to be replaced or regenerated. The software checks the actual voltage of each sender every 3 minutes and stores this value in a table. Colour codes indicate the charge condition of each cell (empty to full) continuously, as a result of which the performance curves are very detailed.

*Free analyzing software and indication of the bad element*

Cell No	00:00	00:03	00:06	00:09	00:12	00:15	00:18	00:21	00:24	00:27	00:30	00:33	00:36	00:39	00:42	00:45	00:48
#1	2.11	2.11	2.04	2.03	2.02	2.01	2.01	2.00	2.00	2.00	2.00	2.00	1.99	1.99	1.98	1.98	1.98
#2	2.13	2.13	2.05	2.05	2.03	2.03	2.03	2.02	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.00
#3	2.14	2.14	2.06	2.06	2.04	2.04	2.04	2.03	2.02	2.02	2.02	2.02	2.02	2.01	2.02	2.01	2.01
#4	2.14	2.14	2.03	2.02	1.99	1.99	1.98	1.97	1.96	1.96	1.96	1.95	1.94	1.94	1.94	1.93	1.93
#5	2.16	2.16	2.03	2.02	1.98	1.98	1.98	1.96	1.95	1.95	1.94	1.93	1.93	1.92	1.92	1.91	1.90
#6	2.13	2.13	2.01	2.00	1.97	1.96	1.96	1.95	1.94	1.94	1.93	1.93	1.93	1.92	1.92	1.91	1.91
#7	2.13	2.13	2.02	2.01	1.99	1.99	1.99	1.98	1.97	1.97	1.97	1.96	1.96	1.96	1.96	1.95	1.95
#8	2.10	2.10	2.02	2.01	2.00	2.00	1.99	1.98	1.98	1.97	1.97	1.97	1.96	1.96	1.96	1.96	1.96
#9	2.10	2.10	2.01	2.00	1.97	1.96	1.96	1.95	1.95	1.94	1.94	1.93	1.93	1.92	1.92	1.92	1.91
#10	2.15	2.15	1.98	1.96	1.92	1.92	1.91	1.89	1.89	1.88	1.87	1.86	1.86	1.85	1.84	1.83	1.83
#11	2.10	2.10	1.91	1.89	1.84	1.83	1.82	1.80	1.78	1.77	1.75	1.73	1.71	1.68	1.65	1.61	1.56
#12	2.14	2.15	1.96	1.96	1.92	1.92	1.91	1.89	1.88	1.87	1.85	1.85	1.84	1.83	1.82	1.81	1.80
Sum	25.58	25.59	24.14	24.01	23.67	23.63	23.58	23.42	23.34	23.28	23.22	23.14	23.08	22.99	22.94	22.83	22.74

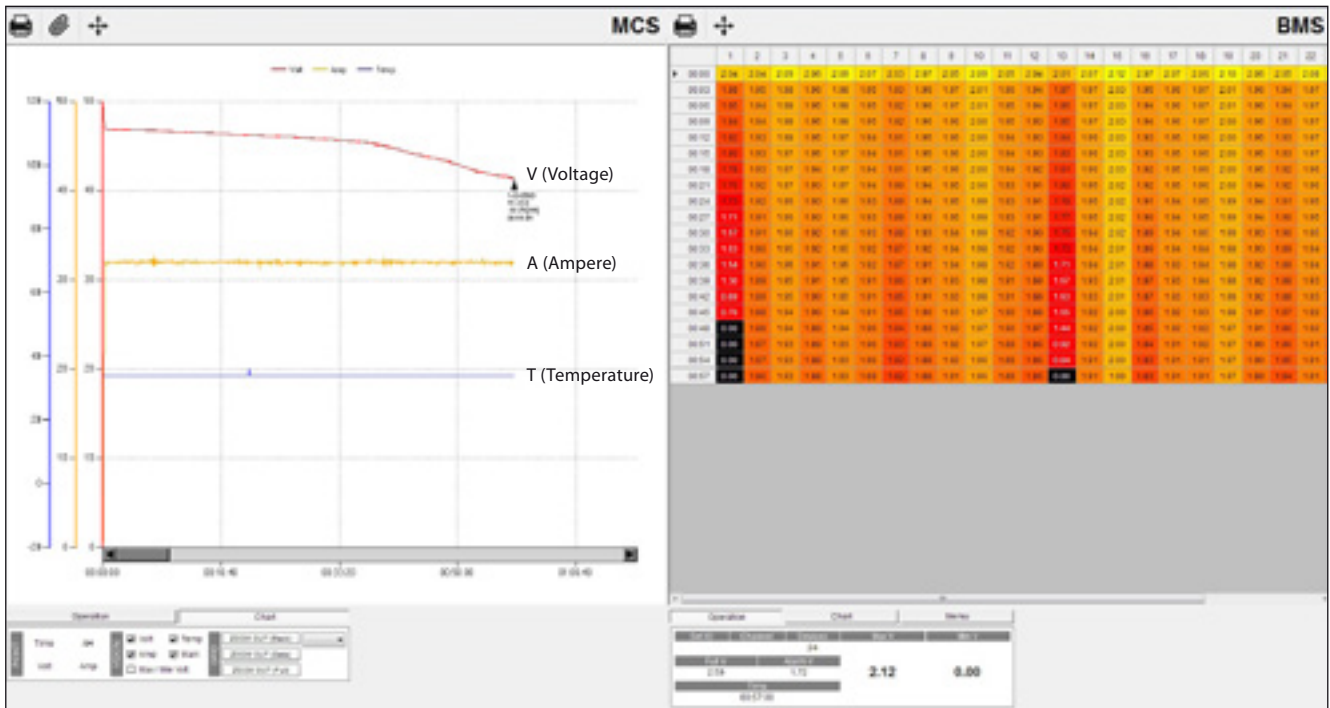
*Custom-made BMS kits available on request.*

REF	Content
<b>141TA5241 – 12 V-120 V</b>	10 sensors* + 1 receiver
<b>141TA1479 – 48 V</b>	24 sensors** + 1 receiver
<b>141TA1480 – 80 V</b>	40 sensors** + 1 receiver

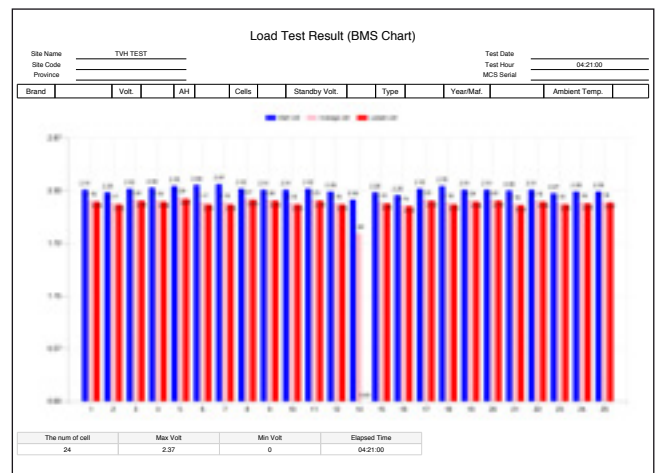
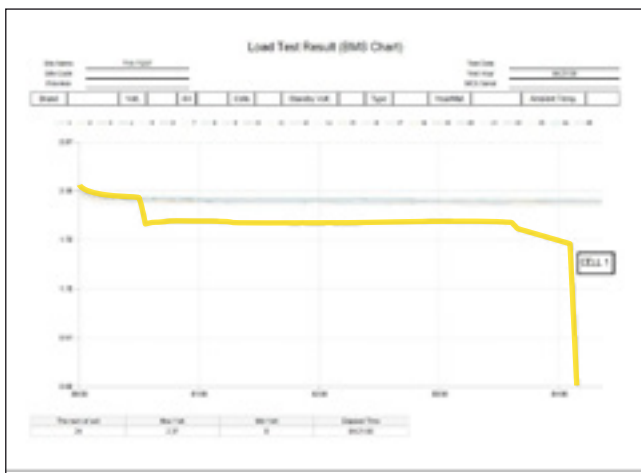
\* each sensor measures 1 battery of 12 V

\*\* each sensor measures 1 cell of 2 V

Synched regeneration report of Replus + BMS system



If you combine the regenerator with the BMS system, then this can be controlled by 1 software package that gives you all the info you need to have a fully detailed view on the condition of your battery down to cell level, during a complete load test. On this particular graph it is clear that the battery has **2 weak cells that need to be replaced**.



With just 2 clicks you can create these fully detailed reports which you can then save as a PDF, Word or Excel file. Professional information that will give you a full understanding of the battery. These reports can be used to inform the customer on the current condition of his battery or can be kept by yourself as a track record of the condition of your own batteries.

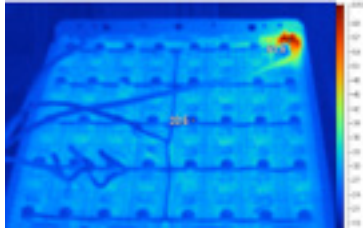
## FLUKE TIS10 / THERMAL IMAGER .....

### REF 147TA5767

- Size (H x W x D): 267 x 101 x 145 mm
- Weight: 0,720 kg
- Warranty: 2-years

### Features

- Built for performance with features that help you easily and quickly identify problems before they become expensive failures
- Higher efficiency of the battery
- Used to analyze chargers



Thermal image was taken on an 80 V battery where – after thermal analysis – it turned out that **a bad connector on this battery was the cause of the battery failure.**

Via the free supplied software it has become clear that the average battery temperature was 22 °C, and that this temperature climbed to 62 °C in the vicinity of the bad connector. A temperature difference is not possible within one and the same battery, so this must be repaired.

### Included accessories

AC power adapter, lithium ion smart battery, USB cable, soft transport bag, quick reference guide and safety sheet. Software is available via download at [www.fluke.com/smartviewdownload](http://www.fluke.com/smartviewdownload)

### Recommended accessories



**FLK-TI-SBP3**  
**REF 140TA8977**  
Extra rechargeable battery



**TI-CAR CHARGER**  
**REF 140TA8978**  
Vehicle charger



**FLK-TI-SBC3**  
**REF 140TA8976**  
Charging base

Fluke connect™ works with WIFI and some countries require special WIFI radio compliance certification.

Countries with WIFI – radio license: Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States

Please contact us if your country is not listed above.



**REF 29793487**  
More test tools in our 'Fluke test tools' catalogue: go to downloads on [www.tvh.com](http://www.tvh.com) or order your free copy.

## DIGITAL HYDROMETER.....

**99,9% accurate and 50% faster than standard density testing.**

REF [138TA7531](#)

### Features:

- Easy operation
- Compact, lightweight design enabling one-hand measurement
- No-hassle measurement of hard-to-reach samples
- Large LCD display with backlight
- Measuring cell with inspection window and backlight

### Specifications:

- Measuring range:
  - Density: 0 g/cm<sup>3</sup> to 3 g/cm<sup>3</sup>
  - Temperature: 0 °C to 40 °C
  - Viscosity: 0 mPa·s to 1000 mPa·s
- Sample volume: 2 ml
- Dimensions (L x W x H): 140 x 138 x 27 mm
- Data memory: 1024 measured results
- Power supply: 2 x 1,5 V alkaline batteries
- Immediately compensates to 25 °C
- Measure the density of all your cells and then export them wirelessly to your PC in Excel



## BATTERY ACID TESTER.....

### REF 145TA2252

The HYDROVOLT battery tester is a heavy-duty, chemical-resistant hydrometer which is direct reading and accurate at all electrolyte temperatures. Its advanced design incorporates important practical features which simplify battery service as never before:

- Handy compact size for use with hard-to-get-at batteries
- Large, easy-to-read scale with quick-check colored sectors
- Readings independent of vertical positioning of instrument
- Fast, bubble-free intake of fluid sample
- Automatic air-lock prevents fluid loss and air bleed
- Unexcelled temperature compensation and measuring accuracy
- Sturdy, shock-resistant materials, completely non-corrosive



## COMPLETE KIT CONVERSION SB175.....

### Universal battery connection kit

### REF 139TA3247

Each cable consists at one side of a SB178, on the other side this may differ: DIN80 - DIN160 - DIN320 - SBX350 - SBE160 - SBX175 - SBE320 - SB50 - SB350 - M10 ring terminal





## DISCHARGER & BMS SYSTEM .....

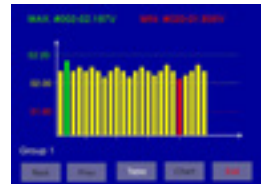
### PORTABLE BATTERY DISCHARGER & BMS SYSTEM

This load bank is designed to discharge batteries with a precisely controlled current - adjustable from zero to the maximum rated value - while keeping the battery voltage under control.

The control board measures the total capacity (Ah) discharged from the battery while the individual cell voltages are constantly monitored during the complete discharge cycle by the included wireless voltage modules. A battery charger can be connected to the discharge system, this way the voltage of each cell can be monitored during both discharge and charge.

With the supplied software you can now easily detect which element is no longer keeping its charge and needs to be replaced or regenerated. All data is automatically stored in the built-in memory and can be consulted on the 5,7 inch LCD touchscreen or transferred to your computer via USB.

**With this package you have all the tools you need to analyze your batteries down to cell level and generate detailed reports. This tool is a professional piece of equipment used to measure your batteries' capacity and detect bad cells.**



#### REF [144TA7479](#)

#### Features:

- Very compact & light-weight unit, extremely suitable for on-site capacity testing.
- Supplied in a strong and mobile flightcase that can easily be taken everywhere.
- 5,7 inch LCD touchscreen for easy operation and display of various parameters in real-time.
- Internal memory: saves each test result automatically and protects data.
- Can be programmed with up to 8 sets of test parameters, speeding up test setup and performance.
- Supports real-time monitoring with a PC or stores data internally for later transfer via USB.
- PC software included for detailed analysis of test results and generation of reports.
- Wireless voltage modules included for individual voltage monitoring of each battery cell.



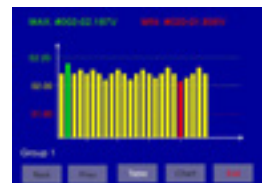
Battery voltage	Discharge current
20-40 V	0-75 A
40-60 V	0-150 A

## HEAVY-DUTY DISCHARGER & BMS SYSTEM.....

This discharger offers you a complete solution for testing all types of lead-acid batteries from 2–96 V. It enables you to discharge your batteries with a precisely controlled current - adjustable from zero to the maximum rated value - while keeping the battery voltage under control. The control board measures the total capacity (Ah) discharged from the battery while the individual cell voltages are constantly monitored during the complete discharge cycle by the included wireless voltage modules . With the supplied software you can now easily detect which element is no longer keeping its charge and needs to be replaced or regenerated. All data is automatically stored in the built-in memory and can be consulted on the 5,7 inch LCD touchscreen or transferred to your computer via USB.



**With this package you have all the tools you need to analyze your batteries down to cell level and generate detailed reports. This tool is a professional piece of equipment used to measure your batteries' capacity and detect bad cells.**



REF 144TA7480

**Features:**

- Supplied in a strong and mobile flightcase (equipped with wheels) that can easily be taken everywhere.
- 5,7 inch LCD touchscreen for easy operation and display of various parameters in real-time.
- Internal memory: saves each test result automatically and protects data.
- Can be programmed with different sets of test parameters to speed up test setup and performance.
- Supports real-time monitoring with a PC or stores data internally for later transfer via USB.
- Pc software included for detailed analysis of test results and generation of reports.
- Wireless voltage modules included for individual voltage monitoring of each battery cell.

*• User-friendly  
• No particular training needed*

Battery voltage	Discharge current
1,6–2,5 V	0–60 A
2,5–6 V	0–180 A
6–120 V	0–200 A



## MULTIVOLTAGE BMS SYSTEM.....

This multivoltage 80 V battery monitoring system offers an exact evaluation down to cell level of your battery by measuring the individual voltage of each separate cell.

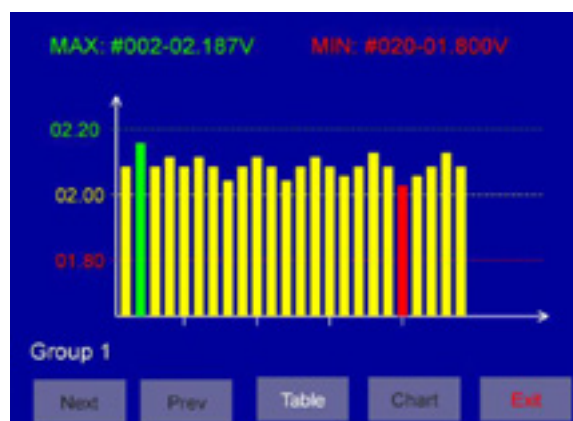
Using this system while charging or discharging gives you a clear view on which cells in your battery bank are the weakest and should be replaced or regenerated. This will permit you to work in a more cost-effective manner. **Make an exact evaluation of your expensive batteries instead of often replacing them unnecessarily.**



### REF [144TA8715](#)

#### Features:

- Wireless bluetooth monitoring of 2 V cells and 6 V or 12 V batteries
- 5, 5" touchscreen
- Current measurements with the supplied current clamp
- Programmable battery type and ideal cell voltages
- Ethernet connection
- The system consists of 10 wireless voltage detectors that can each measure and transmit 4 different voltages to the receiver unit. All data is automatically stored on an SD-card in the receiver
- The stored data can be consulted via the touchscreen and different graphs can be made to easily detect the weakest cells with the receiver unit. The data can also be transferred to your computer through a USB-connection or via an SD card. The supplied software then permits you to draw up detailed reports





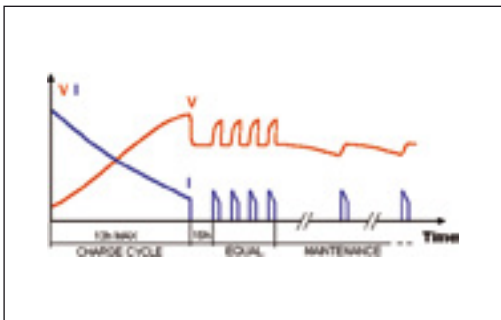


# TRACTION BATTERY CHARGERS

**RE/SINGLE-PHASE** .....





**Single-phase**

Ask for our FREE detailed CD-rom manual:  
**REF 107TA8608**



*We stock over **90%**  
of charger spare parts*

**3-year warranty**  
on all charger parts!

Box S	Box A	Box B	Box C
 <p>250 x 200 x 320 mm</p>	 <p>430 x 285 x 270 mm</p>	 <p>500 x 340 x 360 mm</p>	 <p>500 x 360 x 700 mm</p>

**General information RE**

- Single-phase 230 VAC-50/60 Hz input (other versions available on request)
- Fully automatic
- CE/UL approved
- 10–12 h charge system: Wa (DIN41774)
- Microprocessor-controlled electronic card
- Equalization
- 5-year warranty on transformer, 3-year warranty on all charger parts

## RE/SINGLE-PHASE.....

Amp (A)	Input kVA	Weight (kg)	Box	Cable section mm <sup>2</sup>	Standard charger (10–12 h) charging curve Wa		Fast charger (8 h) charging curve WoWa		Fast charger air pump (8 h) charging curve WoWa	
					Cap. range (Ah)	REF	Cap. range (Ah)	REF	Cap. range (Ah)	REF
<b>12 V</b>										
10	0,16	8	S	6	60–95	<a href="#">106TA9226</a>	42–69	<a href="#">123TA6869</a>	-	-
15	0,25	8	S	6	96–110	<a href="#">106TA9227</a>	70–83	<a href="#">123TA6870</a>	-	-
20	0,33	9	S	6	111–132	<a href="#">106TA9228</a>	84–109	<a href="#">123TA6871</a>	-	-
25	0,40	11	S	10	133–165	<a href="#">106TA8745</a>	110–137	<a href="#">123TA6872</a>	-	-
30	0,50	13	S	10	166–198	<a href="#">106TA9229</a>	138–165	<a href="#">123TA6873</a>	-	-
40	0,65	14	S	10	199–263	<a href="#">106TA9230</a>	166–220	<a href="#">123TA6874</a>	-	-
50	0,80	20	A	16	264–329	<a href="#">106TA9231</a>	221–275	<a href="#">123TA6875</a>	-	-
60	1,00	21	A	16	323–395	<a href="#">106TA8746</a>	276–330	<a href="#">123TA6876</a>	-	-
80	1,30	25	A	25	396–526	<a href="#">106TA8747</a>	331–440	<a href="#">123TA7159</a>	-	-
<b>24 V</b>										
10	0,33	10	S	6	60–95	<a href="#">106TA9232</a>	42–69	<a href="#">116TA7024</a>	-	-
15	0,50	11	S	6	96–110	<a href="#">106TA9233</a>	70–83	<a href="#">116TA7025</a>	-	-
20	0,65	12	S	6	111–132	<a href="#">106TA9234</a>	84–109	<a href="#">123TA6878</a>	-	-
25	0,80	15	S	10	133–165	<a href="#">106TA9235</a>	110–137	<a href="#">116TA7026</a>	-	-
30	1,00	19	A	10	166–198	<a href="#">106TA9236</a>	138–165	<a href="#">116TA7027</a>	-	-
40	1,30	21	A	10	199–263	<a href="#">106TA9237</a>	166–220	<a href="#">116TA7028</a>	-	-
50	1,60	24	A	16	264–329	<a href="#">106TA9238</a>	221–275	<a href="#">116TA7029</a>	-	-
60	2,00	26	A	16	323–395	<a href="#">106TA9239</a>	276–330	<a href="#">116TA7030</a>	-	-
80	2,60	38	B	25	396–526	<a href="#">106TA9240</a>	331–440	<a href="#">116TA7031</a>	-	-
100	3,20	41	C	25	527–658	<a href="#">106TA9241</a>	441–550	<a href="#">116TA7032</a>	441–550	<a href="#">123TA6890</a>
120	4,00	48	C	35	659–789	<a href="#">106TA9242</a>	551–660	<a href="#">116TA7033</a>	551–660	<a href="#">123TA6891</a>
140	4,60	52	C	35	790–921	<a href="#">106TA8748</a>	661–770	<a href="#">116TA7034</a>	661–770	<a href="#">123TA6892</a>
<b>36 V</b>										
30	1,50	23	A	10	166–198	<a href="#">106TA9243</a>	138–165	<a href="#">123TA6879</a>	-	-
40	2,00	25	A	10	199–263	<a href="#">106TA9244</a>	166–220	<a href="#">123TA6880</a>	-	-
50	2,40	30	A	16	264–329	<a href="#">106TA9245</a>	221–275	<a href="#">123TA6881</a>	-	-
60	3,00	38	B	16	323–395	<a href="#">106TA9246</a>	276–330	<a href="#">123TA6882</a>	-	-
80	4,00	40	B	25	396–526	<a href="#">106TA9247</a>	331–440	<a href="#">123TA6883</a>	-	-
100	4,80	53	C	25	527–658	<a href="#">106TA9248</a>	441–550	<a href="#">123TA6884</a>	441–550	<a href="#">123TA6893</a>
120	6,00	55	C	35	659–789	<a href="#">106TA9249</a>	551–660	<a href="#">123TA6885</a>	551–660	<a href="#">123TA6894</a>

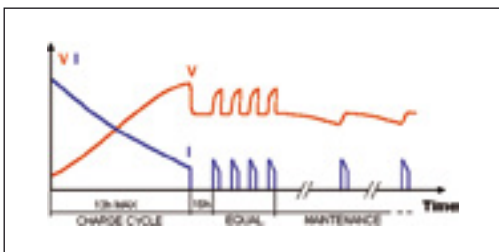
## RE/SINGLE-PHASE.....

Amp (A)	Input kVA	Weight (kg)	Box	Cable section mm <sup>2</sup>	Standard charger (10–12 h) charging curve Wa		Fast charger (8 h) charging curve WoWa		Fast charger air pump (8 h) charging curve WoWa	
					Cap. range (Ah)	REF	Cap. range (Ah)	REF	Cap. range (Ah)	REF
<b>40 V</b>										
50	2,88	34	B	16	264–329	<a href="#">106TA8750</a>	221–275	<a href="#">123TA6886</a>	-	-
60	3,45	39	B	16	323–395	<a href="#">106TA8751</a>	276–330	<a href="#">123TA6887</a>	-	-
80	4,60	59	C	25	396–526	<a href="#">106TA8752</a>	331–440	<a href="#">123TA6888</a>	331–440	<a href="#">123TA6895</a>
100	5,75	67	C	25	527–658	<a href="#">106TA8753</a>	441–550	<a href="#">123TA6889</a>	441–550	<a href="#">123TA6896</a>
<b>48 V</b>										
10	0,65	12	S	6	60–95	<a href="#">106TA8754</a>	42–69	<a href="#">116TA7035</a>	-	-
15	1,00	20	A	6	96–110	<a href="#">106TA8749</a>	70–83	<a href="#">116TA7036</a>	-	-
30	2,00	30	A	10	166–198	<a href="#">106TA9250</a>	138–165	<a href="#">116TA7037</a>	-	-
40	2,60	35	B	10	199–263	<a href="#">106TA9251</a>	166–220	<a href="#">116TA7038</a>	-	-
50	3,25	36	B	16	264–329	<a href="#">106TA9252</a>	221–275	<a href="#">116TA7039</a>	-	-
60	4,00	40	B	16	323–395	<a href="#">106TA9253</a>	276–330	<a href="#">116TA7040</a>	-	-
80	5,20	53	C	25	396–526	<a href="#">106TA9254</a>	331–440	<a href="#">116TA7041</a>	331–440	<a href="#">123TA6897</a>
100	6,50	57	C	25	527–658	<a href="#">106TA9255</a>	441–550	<a href="#">116TA7042</a>	441–550	<a href="#">123TA6898</a>
120	8,00	62	C	35	659–789	<a href="#">106TA8755</a>	551–660	<a href="#">116TA7043</a>	551–660	<a href="#">123TA6899</a>
<b>72 V</b>										
60	6,00	55	C	16	323–395	<a href="#">106TA9256</a>	276–330	<a href="#">116TA7044</a>	276–330	<a href="#">123TA6900</a>
80	8,00	62	C	25	396–526	<a href="#">106TA9257</a>	331–440	<a href="#">116TA7045</a>	331–440	<a href="#">123TA6901</a>
100	9,60	68	C	25	527–658	<a href="#">106TA9258</a>	441–550	<a href="#">116TA7046</a>	441–550	<a href="#">123TA6902</a>
<b>80 V</b>										
40	4,60	46	C	10	199–263	<a href="#">106TA9259</a>	166–220	<a href="#">116TA7047</a>	166–220	<a href="#">123TA6903</a>
60	6,90	55	C	16	323–395	<a href="#">106TA9260</a>	221–330	<a href="#">106TA9261</a>	221–330	<a href="#">123TA6904</a>
80	9,20	67	C	25	396–526	<a href="#">106TA9261</a>	331–440	<a href="#">116TA7049</a>	331–440	<a href="#">123TA6905</a>

## THREE-PHASE TRACTION BATTERY CHARGER: AR DIGITAL ...

### Three-phase

Ask for our FREE detailed manuals:  
**REF 107TA8608** –R box



We stock  
 over **90%**  
 of charger  
 spare  
 parts



**3-year warranty**  
 on all charger parts!

Box	Box B	Box C
500 x 700 mm	500 x 900 x 440 mm	620 x 1050 x 550 mm

### General information AR DIGITAL

- Three-phase 230/400 VAC - 50/60 Hz input
- Single-phase 230 V available on request
- Fully automatic
- CE/UL-approved
- 5-year warranty on transformer, 3-year warranty on all charger parts
- 10–12 h charge system: Wa (DIN41774)
- Microprocessor-controlled electronic card
- Derivative dV/dT charge control
- Digital display: V/cell, current, capacity charged, time of charge, error messages
- Increase in lifespan of battery
- Built-in maintenance system

### ADVANTAGES

- Less chance of damage during transport – if the side becomes dented, the damage is reduced thanks to the spherical shape

### SPARES FOR ARD

#### Control board:

**REF 138TA4136** – ForRD Wa

**REF 138TA4137** – ForRD WoWa

#### Other spares available on request:

- Please provide full charger details: type - voltage -mps - serial number



## THREE-PHASE TRACTION BATTERY CHARGER: AR DIGITAL ...

Amp (A)	Input kVA	Weight (kg)	Cable section mm <sup>2</sup>	Box	Standard charger (10–12 h) charging curve Wa		Fast charger (8 h) charging curve WoWa		Fast charger pump (8 h) charging curve WoWa	
					Cap. range (Ah)	REF	Cap. range (Ah)	REF	Cap. range (Ah)	REF
<b>24 V</b>										
40	1,4	48	10	A	199–263	<a href="#">107TA9513</a>	166–220	<a href="#">123TA6906</a>	166–220	<a href="#">123TA6997</a>
60	2,1	57	16	A	323–395	<a href="#">106TA9180</a>	276–330	<a href="#">123TA6907</a>	276–330	<a href="#">123TA6998</a>
80	2,8	62	25	A	396–526	<a href="#">106TA9181</a>	331–440	<a href="#">123TA6908</a>	331–440	<a href="#">123TA6999</a>
100	3,5	66	25	A	527–658	<a href="#">106TA9182</a>	441–550	<a href="#">123TA6909</a>	441–550	<a href="#">123TA7000</a>
120	4,2	68	35	A	659–789	<a href="#">106TA9183</a>	551–660	<a href="#">123TA6910</a>	551–660	<a href="#">123TA7001</a>
140	4,9	76	35	A	790–921	<a href="#">106TA8699</a>	661–770	<a href="#">123TA6911</a>	661–770	<a href="#">123TA7002</a>
160	5,6	77	50	A	922–1052	<a href="#">106TA8700</a>	771–880	<a href="#">123TA6912</a>	771–880	<a href="#">123TA7003</a>
180	6,3	82	50	A	1053–1184	<a href="#">107TA9514</a>	881–990	<a href="#">123TA6913</a>	881–990	<a href="#">123TA7004</a>
200	7,0	88	50	A	1185–1315	<a href="#">107TA9515</a>	991–1100	<a href="#">123TA6914</a>	991–1100	<a href="#">123TA7158</a>
<b>36 V</b>										
60	3,1	59	16	A	323–395	<a href="#">106TA9184</a>	276–330	<a href="#">123TA6915</a>	276–330	<a href="#">123TA7005</a>
80	4,2	64	25	A	396–526	<a href="#">106TA9185</a>	331–440	<a href="#">123TA6916</a>	331–440	<a href="#">123TA7006</a>
100	5,2	73	25	A	527–658	<a href="#">106TA9186</a>	441–550	<a href="#">123TA6917</a>	441–550	<a href="#">123TA7007</a>
120	6,2	81	35	A	659–789	<a href="#">106TA9187</a>	551–660	<a href="#">123TA6918</a>	551–660	<a href="#">123TA7008</a>
140	7,3	90	35	A	790–921	<a href="#">107TA7661</a>	661–770	<a href="#">123TA6919</a>	661–770	<a href="#">123TA7009</a>
160	8,3	95	50	A	922–1052	<a href="#">108TA4190</a>	771–880	<a href="#">123TA6920</a>	771–880	<a href="#">123TA7010</a>
180	9,4	104	50	A	1053–1184	<a href="#">108TA4191</a>	881–990	<a href="#">123TA6921</a>	881–990	<a href="#">123TA7011</a>
200	10,4	110	50	A	1185–1315	<a href="#">108TA4192</a>	991–1100	<a href="#">123TA6922</a>	991–1100	<a href="#">123TA7012</a>
<b>40 V</b>										
50	2,9	45	16	A	264–329	<a href="#">106TA8701</a>	221–275	<a href="#">123TA6923</a>	221–275	<a href="#">123TA7013</a>
60	3,5	49	16	A	323–395	<a href="#">106TA8702</a>	276–330	<a href="#">123TA6924</a>	276–330	<a href="#">123TA7014</a>
80	4,6	57	25	A	396–526	<a href="#">106TA8703</a>	331–440	<a href="#">123TA6925</a>	331–440	<a href="#">123TA7015</a>
100	5,7	70	25	A	527–658	<a href="#">108TA4193</a>	441–550	<a href="#">123TA6926</a>	441–550	<a href="#">123TA7016</a>
<b>48 V</b>										
40	2,8	56	10	A	199–263	<a href="#">107TA9516</a>	166–220	<a href="#">123TA6927</a>	166–220	<a href="#">123TA7017</a>
50	3,5	60	16	A	264–329	<a href="#">106TA9188</a>	221–275	<a href="#">123TA6928</a>	221–275	<a href="#">123TA7018</a>
60	4,2	66	16	A	323–395	<a href="#">106TA9189</a>	276–330	<a href="#">123TA6929</a>	276–330	<a href="#">123TA7019</a>
80	5,6	75	25	A	396–526	<a href="#">106TA9190</a>	331–440	<a href="#">123TA6930</a>	331–440	<a href="#">123TA7020</a>
100	7,0	82	25	A	527–658	<a href="#">106TA9191</a>	441–550	<a href="#">123TA6931</a>	441–550	<a href="#">123TA7021</a>
120	8,4	89	35	A	659–789	<a href="#">106TA9192</a>	551–660	<a href="#">123TA6932</a>	551–660	<a href="#">123TA7022</a>
140	9,8	99	35	A	790–921	<a href="#">106TA8704</a>	661–770	<a href="#">123TA6933</a>	661–770	<a href="#">123TA7023</a>
160	11,2	113	50	A	922–1052	<a href="#">106TA8705</a>	771–880	<a href="#">123TA6934</a>	771–880	<a href="#">123TA7024</a>
180	12,6	122	50	A	1053–1184	<a href="#">107TA9517</a>	881–990	<a href="#">123TA6935</a>	881–990	<a href="#">123TA7025</a>
200	14	132	50	B	1185–1315	<a href="#">140TA8686</a>	991–1100	<a href="#">140TA8688</a>	991–1100	<a href="#">140TA8689</a>

## THREE-PHASE TRACTION BATTERY CHARGER: AR DIGITAL ...

Amp (A)	Input kVA	Weight (kg)	Cable section mm <sup>2</sup>	Box	Standard charger (10–12 h) charging curve Wa		Fast charger (8 h) charging curve WoWa		Fast charger ir pump (8 h) charging curve WoWa	
					Cap. range (Ah)	REF	Cap. range (Ah)	REF	Cap. range (Ah)	REF
<b>72 V</b>										
60	6,3	80	16	A	323–395	<a href="#">106TA9193</a>	276–330	<a href="#">123TA6937</a>	276–330	<a href="#">123TA6967</a>
80	8,3	88	25	A	396–526	<a href="#">106TA9194</a>	331–440	<a href="#">123TA6938</a>	331–440	<a href="#">123TA6968</a>
100	10,5	94	25	A	527–658	<a href="#">106TA8706</a>	441–550	<a href="#">123TA6939</a>	441–550	<a href="#">123TA6969</a>
120	12,5	113	35	A	659–789	<a href="#">106TA8707</a>	551–660	<a href="#">123TA6940</a>	551–660	<a href="#">123TA6970</a>
140	14,6	122	35	A	790–921	<a href="#">106TA8708</a>	661–770	<a href="#">123TA6941</a>	661–770	<a href="#">123TA6971</a>
160	16,6	131	50	A	922–1052	<a href="#">107TA9519</a>	771–880	<a href="#">123TA6942</a>	771–880	<a href="#">123TA6972</a>
<b>80 V</b>										
40	4,6	66	10	A	199–263	<a href="#">107TA9520</a>	166–220	<a href="#">123TA6943</a>	166–220	<a href="#">123TA6973</a>
60	6,9	81	16	A	323–395	<a href="#">106TA9195</a>	276–330	<a href="#">123TA6944</a>	276–330	<a href="#">123TA6974</a>
80	9,2	93	25	A	396–526	<a href="#">106TA9196</a>	331–440	<a href="#">123TA6945</a>	331–440	<a href="#">123TA6975</a>
100	11,5	105	25	A	527–658	<a href="#">106TA8709</a>	441–550	<a href="#">123TA6946</a>	441–550	<a href="#">123TA6976</a>
120	13,8	117	35	A	659–789	<a href="#">106TA8710</a>	551–660	<a href="#">123TA6947</a>	551–660	<a href="#">123TA6977</a>
140	16,1	124	35	A	790–921	<a href="#">106TA8711</a>	661–770	<a href="#">123TA6948</a>	661–770	<a href="#">123TA6978</a>
160	18,4	129	50	B	922–1052	<a href="#">140TA8728</a>	771–880	<a href="#">140TA8690</a>	771–880	<a href="#">123TA6979</a>
180	20,7	135	50	B	1053–1184	<a href="#">140TA8687</a>	881–990	<a href="#">140TA8691</a>	881–990	<a href="#">140TA8692</a>
200	13,0	142	50	B	1185–1315	<a href="#">140TA8693</a>	991–1100	<a href="#">140TA8694</a>	991–1100	<a href="#">140TA8695</a>
220	15,3	180	50	B	1316–1446	<a href="#">140TA8696</a>	1101–1210	<a href="#">140TA8697</a>	1101–1210	<a href="#">140TA8698</a>
240	27,6	185	70	B	1447–1577	<a href="#">140TA8699</a>	1211–1320	<a href="#">140TA8700</a>	1211–1320	<a href="#">140TA8701</a>
260	29,9	190	70	B	1578–1708	<a href="#">140TA8702</a>	1321–1430	<a href="#">140TA8703</a>	1321–1430	<a href="#">140TA8704</a>
280	32,2	195	70	B	1709–1839	<a href="#">140TA8705</a>	1431–1540	<a href="#">140TA8706</a>	1431–1540	<a href="#">140TA8707</a>
<b>96 V</b>										
60	8,4	90	16	A	323–395	<a href="#">107TA9529</a>	276–330	<a href="#">123TA6956</a>	276–330	<a href="#">123TA6986</a>
80	11,2	100	25	A	396–526	<a href="#">107TA9530</a>	331–440	<a href="#">123TA6957</a>	331–440	<a href="#">123TA6987</a>
100	14,0	118	25	A	527–658	<a href="#">107TA9531</a>	441–550	<a href="#">123TA6958</a>	441–550	<a href="#">123TA6988</a>
120	16,8	123	35	B	659–789	<a href="#">140TA8708</a>	551–660	<a href="#">140TA8709</a>	551–660	<a href="#">140TA8710</a>
140	19,6	135	35	B	790–921	<a href="#">140TA8711</a>	661–770	<a href="#">140TA8712</a>	661–770	<a href="#">140TA8713</a>
160	22,4	148	50	B	922–1052	<a href="#">140TA8714</a>	771–880	<a href="#">140TA8715</a>	771–880	<a href="#">140TA8716</a>
200	28,0	180	50	B	1185–1315	<a href="#">140TA8717</a>	991–1100	<a href="#">140TA8718</a>	991–1100	<a href="#">140TA8719</a>
240	33,6	195	70	C	1447–1577	<a href="#">140TA8720</a>	1211–1320	<a href="#">140TA8721</a>	1211–1320	<a href="#">140TA8722</a>
260	36,4	205	70	C	1578–1708	<a href="#">140TA8723</a>	1321–1430	<a href="#">140TA8724</a>	1321–1430	<a href="#">140TA8725</a>
280	39,2	215	70	C	1709–1839	<a href="#">140TA8726</a>	1431–1540	<a href="#">140TA8727</a>	1431–1540	<a href="#">140TA8710</a>
320	44,8	230	95	B	1840–2104	<a href="#">140TA8729</a>	1541–1760	<a href="#">140TA8730</a>	1541–1760	<a href="#">140TA8731</a>

## RX SERIES.....

Single-phase

Three-phase

Ask for our FREE detailed CD-rom manual:  
REF **107TA8608**

<p><b>Box S</b></p>  <p>250 x 200 x 320 mm</p>	<p><b>Box A</b></p>  <p>430 x 285 x 270 mm</p>
<p><b>Box B</b></p>  <p>500 x 340 x 360 mm</p>	<p><b>Box C</b></p>  <p>500 x 360 x 700 mm</p>



*We stock over 90%  
of charger spare parts*

*1-year warranty  
on all charger parts!*

### General information RX

- Fully automatic, microprocessor-controlled battery charger.
- Compact and simple construction.
- LED control panel:
  - Battery connected – in charge
  - Final charge
  - Charge complete - Equalization
  - Emergency stop
  - Black-out of the mains
  - Ammeter 0 -100%
- Automatic equalization of the battery.
- Automatic start on battery connection, with 3 delays to avoid arcing between the connectors. Automatic shutdown on battery disconnection during the charge.
- Automatic saving of the charge parameters in case of black-out of the mains and automatic restart when the input is available.
- Input voltages single-phase 220 VAC or three-phase 380 VAC. Other input voltages available on request.
- Charge curve Wa (DIN41774).
- 1-year warranty on all charger parts.

## RX SERIES .....

Volt	Amp	Capacity range vs time of charge	Box	Weight	Input power	Cable section	REF
<b>RX/ Single-phase / 220 VAC</b>							
24 V	20 A	100–120 Ah	S	13 kg	0,70 kVA	10 mm <sup>2</sup>	<a href="#"><u>122TA8161</u></a>
24 V	25 A	125–150 Ah	S	14 kg	0,85 kVA	10 mm <sup>2</sup>	<a href="#"><u>122TA8162</u></a>
24 V	30 A	150–180 Ah	S	17 kg	1,00 kVA	10 mm <sup>2</sup>	<a href="#"><u>122TA8163</u></a>
24 V	40 A	200–240 Ah	A	19 kg	1,30 kVA	10 mm <sup>2</sup>	<a href="#"><u>122TA8164</u></a>
24 V	50 A	250–300 Ah	A	22 kg	1,70 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8165</u></a>
24 V	60 A	300–360 Ah	A	24 kg	2,00 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8166</u></a>
24 V	80 A	360–500 Ah	B	40 kg	2,80 kVA	25 mm <sup>2</sup>	<a href="#"><u>139TA2548</u></a>
48 V	60 A	300–360 Ah	B	43 kg	4,20 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8167</u></a>
48 V	80 A	360–500 Ah	B	48 kg	5,60 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8168</u></a>
48 V	100 A	500–599 Ah	B	47 kg	7,00 kVA	25 mm <sup>2</sup>	<a href="#"><u>138TA4138</u></a>
48 V	120 A	600–749 Ah	B	51 kg	8,40 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4139</u></a>
<b>RX/ Three-phase / 380 VAC</b>							
24 V	60 A	300–360 Ah	B	37 kg	2,10 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8169</u></a>
24 V	80 A	360–500 Ah	B	41kg	2,80 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8170</u></a>
24 V	100 A	500–600 Ah	B	44 kg	3,50 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8171</u></a>
24 V	120 A	600–749 Ah	B	50 kg	4,20 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4140</u></a>
24 V	140 A	750–899 Ah	C	52 kg	4,90 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4141</u></a>
24 V	160 A	900–1024 Ah	C	56 kg	5,60 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4142</u></a>
24 V	180 A	1025–1149 Ah	C	58 kg	6,30 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4143</u></a>
24 V	200 A	1185–1299 Ah	C	65 kg	7,00 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4144</u></a>
36 V	60 A	300–360 Ah	B	41 kg	3,10 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8172</u></a>
36 V	80 A	360–500 Ah	B	45 kg	4,20 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8173</u></a>
36 V	100 A	500–600 Ah	B	48 kg	5,20 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8174</u></a>
36 V	120 A	600–749 Ah	B	50 kg	6,20 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4145</u></a>
36 V	140 A	750–899 Ah	C	55 kg	7,30 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4146</u></a>
36 V	160 A	900–1024 Ah	C	62 kg	8,30 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4147</u></a>
36 V	180 A	1025–1149 Ah	C	68 kg	9,40 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4148</u></a>
36 V	200 A	1185–1299 Ah	C	80 kg	10,40 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4149</u></a>
40 V	50 A	250–300 Ah	B	40 kg	4,40 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8175</u></a>
40 V	60 A	300–360 Ah	B	42 kg	5,30 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8176</u></a>
40 V	80 A	360–500 Ah	B	48 kg	7,00 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8177</u></a>
48 V	50 A	250–300 Ah	B	39 kg	2,80 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8178</u></a>
48 V	60 A	300–360Ah	B	43 kg	4,20 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8179</u></a>
48 V	80 A	360–500Ah	B	49 kg	5,60 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8180</u></a>
48 V	100 A	500–600 Ah	B	53 kg	7,00 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8181</u></a>
48 V	120 A	600–749 Ah	B	62 kg	8,40 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4150</u></a>
48 V	140 A	750–899 Ah	C	70 kg	9,80 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4151</u></a>
48 V	160 A	900–1024 Ah	C	79 kg	11,20 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4152</u></a>
48 V	180 A	1025–1149 Ah	C	86 kg	12,60 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4153</u></a>
48 V	200 A	1185–1299 Ah	C	94 kg	14,00 kVA	50 mm <sup>2</sup>	<a href="#"><u>138TA4154</u></a>
72 V	60 A	300–360 Ah	B	53 kg	6,30 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8182</u></a>
72 V	80 A	360–500 Ah	B	55 kg	8,30 kVA	25 mm <sup>2</sup>	<a href="#"><u>122TA8183</u></a>
72 V	100 A	500–599 Ah	C	71 kg	10,50 kVA	25 mm <sup>2</sup>	<a href="#"><u>138TA4155</u></a>
72 V	120 A	600–749 Ah	C	83 kg	12,50 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4156</u></a>
80 V	60 A	300–360 Ah	B	55 kg	6,90 kVA	16 mm <sup>2</sup>	<a href="#"><u>122TA8184</u></a>
80 V	80 A	360–500 Ah	B	65 kg	9,20 kVA	25 mm <sup>2</sup>	<a href="#"><u>138TA4157</u></a>
80 V	100 A	500–599 Ah	C	80 kg	11,50 kVA	25 mm <sup>2</sup>	<a href="#"><u>138TA4158</u></a>
80 V	120 A	600–749 Ah	C	87 kg	13,80 kVA	35 mm <sup>2</sup>	<a href="#"><u>138TA4159</u></a>

## OPPERTUNITY CHARGER: AR-TOP .....

The AR-TOP brings to the industry the outstanding performances and the proven reliability of the Energic Plus® chargers, with a totally new digital control board.

This combination offers a unique package of features and benefits, at a competitive price. All the operating parameters of the AR-TOP are easily programmable (and password-protected) through the user interface and the charger can operate in both conventional and opportunity charging applications.

The complete set of functionalities of these chargers satisfies the needs of both basic and advanced users. These systems are scalable and expandable.

### BENEFITS

Opportunity charging involves charging the battery at ~25A /100 Ahrs charge rates whenever possible (e.g., lunch breaks and in between shifts). Due to frequent charging and to limit battery gas generation, opportunity chargers are normally set to charge batteries up to 80%-85% SOC throughout the day and back to 100% once a day (e.g., during night hours).

Opportunity charging is a good choice for extended shift operations where battery changing can be eliminated. In addition, opportunity charging extends the run time of aging batteries and recoups the lost capacity that comes with age (note the battery's end of life criteria is when the battery capacity reaches 80% of its new value).

Contact us via [info@energicplus.com](mailto:info@energicplus.com) for more information.



*Battery monitoring  
software/device  
available on  
request*

*We stock over  
90% of charger  
spare parts*

*3-year warranty  
on all charger parts!*

### General information

- AR-TOP (New control board + dual charging curve)
- Three-phase 230/400 VAC 50/60 Hz input
- Single-phase 230 V available on request
- Fully automatic, microprocessor-controlled
- Dual selectable charging curve: Wa (10–12 hours) / Wsa-pulse (7–8 hours)
- Derivative dV/dT charge control
- Digital display (16 x 2 LCD): V/cell, current, capacity charged, time of charge, error messages, end codes, history log
- Automatic equalization/Maintenance/Refresh functions
- Programmable gassing voltage
- Battery recovery/desulphation cycle
- Programmable real-time clock functionalities (day/time):
  - Off-peak charging time window
  - Equalize time and days
  - Opportunity charging time frame
- Data storage capabilities
- Connectivity package: RS-485, USB (optional), wireless (optional)
- Compatible with wireless battery ID modules
- Compatible with web-based fleet management system
- Stackable cabinet (up to 3 units high)
- 3-year warranty on all charger parts

## MULTIVOLTAGE BATTERY CHARGER: MVX .....

### Multivoltage

Universal charging capability: multivoltage, multicapacity, multichemistry, from single cell to full battery packs.  
IGBT HF - Hybrid Converter Technology

*We stock over 90%  
of charger spare parts*

**3-year warranty**  
on all charger parts!



### DIFFERENT MODELS AVAILABLE

Type	MVX S-100	MVX L-80	MVX M-50
<b>Output voltage range</b>	2-35 VDC	2-65 VDC	2-130 VDC
<b>Max output current</b>	100 A	80 A	50 A
<b>Max output power</b>	3 kW	3 kW	3 kW
<b>Reference</b>	<b><u>141TA6723</u></b>	<b><u>141TA6724</u></b>	<b><u>141TA6725</u></b>

### General information

- Input single-phase 220-230-240 VAC ±10%
- Efficiency > 90%, power factor > 0,90
- Full set of standard charging curves factory programmed
- Possibility to create and save customized charging curves of any type
- Intelligent electronic protection system (includes soft start, battery polarity reversal, output short circuit and over-temperature)
- Battery voltage/temperature compensation (battery temperature probe required)
- Anti-arcing protection (auxiliary wires required)
- Power-on self-test
- When a black-out of the AC input occurs, all the data related to the charge cycle that was in progress are saved in the Charge History Logger, and remains available for future review. When the AC input is restored, the charger restarts from the exact point of interruption, and it completes the charge cycle normally
- Dimensions (W x H x D): 325 x 550 x 560 mm
- 5-year warranty on transformer, 3-year warranty on all charger parts
- Integrated data-logger (200 cycles)
- CE-approved

## MULTIVOLTAGE BATTERY: MVD .....

### Multivoltage

The MVD is a HF charger with IUa charge curve, where the constant current (phase I) is adjustable from zero to maximum rated value of the charger with a potentiometer, and the constant voltage (phase U) is selectable from 12 different thresholds. This charger is suitable for any type of battery (lead-acid, gel, voltage, capacity). Long time, low constant current.

REF 140TA7514	REF 140TA7515	REF 140TA7516
<ul style="list-style-type: none"> <li>• 2 V cell selectable</li> <li>• 2–80 V</li> <li>• 0–100 A</li> </ul>	<ul style="list-style-type: none"> <li>• 2 V cell selectable</li> <li>• 2–80 V</li> <li>• 0–150 A</li> </ul>	<ul style="list-style-type: none"> <li>• 2 V cell selectable</li> <li>• 2–80 V</li> <li>• 0–200 A</li> </ul>

The MVD is equipped with a fully electronic protection system:

*We stock over 90% of charger spare parts*



Box D: 500 x 440 x 900 mm

**3-year warranty**  
on all charger parts!

**CAPABLE OF CHARGING  
SINGLE BATTERY CELLS.  
UNBEATABLE FLEXIBILITY.**

### AUTOTEST + ZERO INRUSH CURRENT

When the MVD is turned on, a complete test of the functionality of the unit is performed automatically, in less than 10 seconds. In case of faults, the MVD remains in standby and the internal circuits are not powered. This assures maximum safety for the user. While the autotest is in progress, the internal capacitors of the MVD are precharged. This assures that the AC-input current of the charger, when the transformer will be powered, will increase gradually, without an inrush peak which could create problems with the protection/limiter devices.

### SOFT START

The output current of the charger always increases gradually. Therefore, if the user turns on the MVD with the current potentiometer already set to the maximum value, the current will also increase progressively and will reach the max value in 3–5 seconds. This reduces the risk of sparks between the connectors.

### REVERSE POLARITY PROTECTION

If a battery is connected with reverse polarity, no current flows through the wires. The MVD remains in standby and an opposite LED “Reverse Polarity” lights up on the front panel. When the battery is reconnected with the right polarity, the MVD restarts automatically. This is the best and safest polarity protection system that a charger can have.

### OUTPUT SHORT CIRCUIT PROTECTION

The MVD can work without problems with the output cables connected together, in case of short circuit no damage will occur.

### TEMPERATURE PROTECTION

In case of overheating of the power components (e.g. because the internal fan is blocked) the MVD reduces the output current to zero and a LED “Thermal protection” lights up. With the optional battery temperature probe, the MVD can do the same in case of overheating of the battery.

#### Optional battery temperature probe



REF 122TA9100



# HIGH-FREQUENCY CHARGERS

## HF CHARGERS.....

### WHY CHOOSE A HF CHARGER?

- Maximum energy saving
- Longer total battery life
- Greater total cycle life
- Reduced battery heating
- Reduced charging times
- Lower water consumption
- Lower labour and need for water
- Optimized charge curves
- Thermal compensation
- Superior safety and self-protection
- Minimized weight and size



**18-months warranty**  
on all charger parts!

### HF BATTERY CHARGERS FACE THE STATE-OF-THE-ART HF TECHNOLOGY

- Coated printed circuit boards
- Metal case and self-extinguishing ABS
- Weight and size are minimized
- Adaptable to every use and very flexible
- HF battery chargers are all controlled by microprocessor and internally protected against overload, short circuit, incorrect battery connection and voltage transients
- With an internal selection, the chargers can be adapted to a wide range of battery capacities
- HF battery chargers operate at 85–90% efficiency for the maximum saving of electric power cost
- With the thermal sensor option the charger's output electronically compensates the gasification voltage accordingly to the battery temperature
- CE-certified (in conformity with EC directive 89/336/EEC regarding electromagnetic compatibility)

#### General information

- Operating temperature: -20 °C to 50 °C
- Output short circuit protection
- Reverse polarity protection
- Audible alarm system
- Automatic thermal compensation
- 18-months warranty on all charger parts

## HF CHARGERS.....

Charging times			Model	Type	I1 (A)	IMAX (A)	Input voltage (VAC)	NET input current (A)	REF For lead acid and gel/AGM
7-8,5 h (Ah)	9-11 h (Ah)	12-13 h (Ah)							
<b>12 V</b>									
70-95	120		UBC	12 18	15	18	230	2	<a href="#">141TA6688*</a>
145	190	240	BC1	12 35	30	36	230	3	<a href="#">141TA6689*</a>
240-360	400-480	520-560	NG1	12 60	50	60	230	5	<a href="#">135TA9747</a>
<b>24 V</b>									
80	100	125	UBC	24 15	12,5	15	230	3	<a href="#">141TA6690*</a>
200	250	300	BC1	24 30	25	30	230	5	<a href="#">141TA6691*</a>
145-215	240-290	310-335	NG1	24 35	30	36	230	7	<a href="#">135TA9748</a>
180-270	300-360	390-420	NG1	24 45	37,5	45	230	8	<a href="#">141TA6692</a>
240-360	400-480	520-560	NG3	24 60	50	60	230	11	<a href="#">135TA9750</a>
335-505	560-670	730-785	NG3	24 85	70	84	230	15	<a href="#">135TA9751</a>
385-575	640-770	830-895	NG3	24 95	80	96	230	17**	<a href="#">135TA9752</a>
480-720	800-960	1040-1120	NG3	24 100	100	100	230	22**	<a href="#">135TA9753</a>
480-720	800-960	1040-1120	NG5	24 120	100	120	400	7	<a href="#">135TA9754</a>
575-865	960-1150	1250-1345	NG9	24 145	120	144	400	8	<a href="#">135TA9755</a>
960-1440	1600-1920	2080-2240	NG9+	24 200	200	200	400	14	<a href="#">135TA9756</a>
<b>36 V</b>									
95-145	160-190	210-225	NG1	36 25	20	24	230	6	<a href="#">135TA9757</a>
240-360	400-480	520-560	NG3	36 60	50	60	230	16**	<a href="#">135TA9758</a>
290-430	480-575	625-670	NG3	36 70	60	72	230	19**	<a href="#">135TA9759</a>
480-720	800-960	1040-1120	NG5	36 120	100	120	400	10	<a href="#">135TA9760</a>
575-865	960-1150	1250-1345	NG9	36 145	120	144	400	12	<a href="#">135TA9761</a>
960-1440	1600-1920	2080-2240	NGTOP	36 200	200	200	400	17	<a href="#">135TA9762</a>
<b>48 V</b>									
85-130	145-175	185-200	NG1	48 22	18	21,6	230	6	<a href="#">135TA9763</a>
175-260	290-345	375-405	NG3	48 45	36	43,2	230	16**	<a href="#">135TA9764</a>
240-360	400-480	520-560	NG3	48 60	50	60	230	22**	<a href="#">135TA9765</a>
385-575	640-770	830-895	NG5	48 95	80	96	400	11	<a href="#">135TA9766</a>
480-720	800-960	1040-1120	NG7	48 120	100	120	400	14	<a href="#">135TA9767</a>
575-865	960-1150	1250-1345	NG9	48 145	120	144	400	16	<a href="#">135TA9768</a>
650-970	1080-1295	1405-1510	NG9+	48 160	135	162	400	18	<a href="#">135TA9769</a>
815-1225	1360-1630	1770-1905	NGTOP	48 170	170	170	400	23	<a href="#">135TA9770</a>

\* Only lead-acid, gel/AGM on demand

\*\* Attention: current consumption  $\geq 16$  A

- NG1 range is equipped with output cable and schuko plug
- NG3 range is equipped with output cable
- NG9 range over 135 A is equipped with output cable 50 mm<sup>2</sup> size
- NG3, 24 V 100 A, NP9 plus 24 V 200 A and NG9 top 48 V 170 A cannot work with a wuia curve

## HF CHARGERS.....

Charging times			Model	Type	I1 (A)	IMAX (A)	Input voltage (VAC)	NET input current (A)	REF
7-8,5 h (Ah)	9-11 h (Ah)	12-13 h (Ah)							
<b>72 V</b>									
50-70	80-95	105-110	NG1	72 12	10	12	230	6	<a href="#">135TA9771</a>
105-160	175-210	230-245	NG3	72 25	22	26,4	230	14	<a href="#">135TA9772</a>
145-215	240-290	310-335	NG3	72 35	30	36	230	19**	<a href="#">135TA9773</a>
265-395	440-530	570-615	NG5	72 65	55	66	400	11	<a href="#">135TA9774</a>
335-505	560-670	730-785	NG7	72 85	70	84	400	14	<a href="#">135TA9775</a>
430-650	720-865	935-1010	NG9	72 110	90	108	400	18	<a href="#">135TA9776</a>
<b>80 V</b>									
105-160	175-210	230-245	NG3	80 25	22	26,4	230	16**	<a href="#">135TA9777</a>
130-195	215-260	280-300	NG3	80 30	27	32,4	230	19**	<a href="#">135TA9778</a>
240-360	400-480	520-560	NG5	80 60	50	60	400	11	<a href="#">135TA9779</a>
300-450	500-600	650-700	NG7	80 75	62,5	75	400	14	<a href="#">135TA9780</a>
385-575	640-770	830-895	NG9	80 100	80	96	400	18	<a href="#">135TA9781</a>
600-900	1000-1200	1300-1400	NGTOP	80 150	125	150	400	28	<a href="#">135TA9782</a>

\*\* Attention: current consumption  $\geq 16$  A

- NG1 range is equipped with output cable and schuko plug
- NG3 range is equipped with output cable
- NG9 range over 135 A is equipped with output cable 50 mm<sup>2</sup> size
- NG3, 24 V 100 A, NP9 plus 24 V 200 A and NG9 top 48 V 170 A cannot work with a wuia curve



### UBC

- Size: 230 x 110 x 65 mm
- Weight: 850 g
- Single-phase 230 VAC input



### BC1

- Size: 285 x 105 x 75 mm
- Weight: 1,5 kg
- Single-phase 230 VAC input



### NG1

- Size: 300 x 160 x 80 mm
- Weight: 2,2 kg
- Single-phase 230 VAC input



### NG3

- Size: 425 x 215 x 90 mm
- Weight: 5,5 kg
- Single-phase 230 VAC input



### NG5/7/9

- Size: 520 x 260 x 100 mm
- Weight: 9 kg
- Three-phase 400 VAC input

## HF CHARGER WITH PRE-INSTALLED AIR PUMP KIT .....

**20% FASTER CHARGE WITH AIR-PUMP!**



Only for acid batteries

Type	Battery voltage	Output current	Battery capacity	REF
<b>230 V MONO</b>				
NG1 24/35	24 V	35 A	120–300 Ah	<a href="#"><u>124TA1690</u></a>
NG3 24/60	24 V	60 A	200–500 Ah	<a href="#"><u>124TA1691</u></a>
NG3 24/95	24 V	95 A	320–800 Ah	<a href="#"><u>124TA1692</u></a>
NG3 36/70	36 V	70 A	240–600 Ah	<a href="#"><u>124TA1693</u></a>
NG3 48/60	48 V	60 A	200–500 Ah	<a href="#"><u>124TA1694</u></a>
<b>400 V TRI</b>				
NG5 24/100	24 V	100 A	400–1000 Ah	<a href="#"><u>124TA1695</u></a>
NG9 24/120	24 V	120 A	480–1200 Ah	<a href="#"><u>124TA1699</u></a>
NGTOP 24/200	24 V	200 A	800–2000 Ah	<a href="#"><u>124TA1702</u></a>
NG5 36/100	36 V	100 A	400–1000 Ah	<a href="#"><u>124TA1696</u></a>
NG5 48/95	48 V	95 A	320–800 Ah	<a href="#"><u>124TA1697</u></a>
NG7 48/100	48 V	100 A	400–1000 Ah	<a href="#"><u>124TA1698</u></a>
NG9 48/120	48 V	120 A	480–1200 Ah	<a href="#"><u>124TA1700</u></a>
NGTOP 48/170	48 V	170 A	700–1600 Ah	<a href="#"><u>124TA1703</u></a>
NG9 80/100	80 V	100 A	320–800 Ah	<a href="#"><u>124TA1701</u></a>
NGTOP 80/150	80 V	150 A	600–1250 Ah	<a href="#"><u>124TA1704</u></a>

## HF BATTERY CHARGER FOR CLUB CAR, E-Z-GO & YAMAHA...

- UL-approved, CE-certified
- User manual with troubleshooting codes
- Set to flooded lead-acid batteries (AGM or Gel settings available on request)
- Easy-to-read red, yellow, green lights indicate the charge status
- Lightweight (5,4 kg) and portable thanks to the convenient handle (dimensions: 270 x 190 x 120 mm)
- Float feature allows for batteries to maintain full charge at the end of charge cycle
- Choose DC-connectors for various golf carts including 36 V/48 V E-Z-GO, 36/48 V Club Car & 48 V Yamaha
- Begin charge cycle with batteries as low as 2 volts



REF 147TA5194	REF 147TA6884
36 V - 25 A	48 V - 25 A
Charger can be set for 36 V or 48 V operation by opening the lid and modifying the dipswitch configuration. If you order one of the above references it will be preset to the corresponding voltage.	



## CONNECTION CABLES

Vehicle	36 V E-Z-GO	48 V E-Z-GO	48 V E-Z-GO TXT	36 V Club Car/ Yamaha G9, G14, G16	48 V Club Car	Yamaha G19, G22	TDRE Yamaha
Set of 3 connection cables REF 147TA6151		✓		✓	✓		
Set of the 7 connection cables REF 147TA6152	✓	✓	✓	✓	✓	✓	✓
REF connection cable	<a href="#">147TA6131</a>	<a href="#">147TA6132</a>	<a href="#">147TA6133</a>	<a href="#">147TA6134</a>	<a href="#">147TA6135</a>	<a href="#">147TA6136</a>	<a href="#">147TA6137</a>



**More batteries, chargers  
and accessories?**

Go to downloads on  
[www.energicplus.com](http://www.energicplus.com) to view  
our complete range. For more  
information, contact us on  
[info@energicplus.com](mailto:info@energicplus.com)



# HF MULTIVOLTAGE BATTERY CHARGER.....

## MULTIVOLTAGE BATTERY CHARGER

**REF 124TA1705**

This High Frequency Multivoltage battery charger with CAN BUS is a fully digital device with a double function: constant current generator and battery charger, with CAN BUS interface. Versatility, efficiency, and on the spot service remain its fundamental points of strength, combined together with the innovative features of CAN BUS chargers: "flash" microprocessor endowing enabling high calculation power and huge storage capacity, regulation of all charging features by a single button, and the possibility to view in historical data concerning previous charge cycles.

**AS CURRENT GENERATOR:** allows recovery of sulphated or total discharged batteries. Using MODE button, a constant current charge can be sustained for a long duration, achieving de-sulphation of batteries.

**AS BATTERY CHARGER:** allows the recharge of batteries from 2 to 96 V nominal, with adjustable current from 0 to 50 A, and selectable time from 1 to 100 hours.

- Charger weight only 9 kg and is easy to move.
- This unit can be used for on-site assistance, providing improved charging of any battery or replacement of any old charger that may have failed.



Battery voltage	Charging – time			Type	VAC	I1	IMAX	Mains
	10 h	11 ÷ 12 h	13 ÷ 18 h					
2 V → 96 V	50 ÷ 400	450 ÷ 520	560 ÷ 950	2-96 50	400	50	50	1 A → 15 A

# ACCESSORIES FOR HF CHARGERS.....

### Thermal sensor

**REF 116TA6110**

- Thermal sensor for automatic compensation. Adjusts the battery voltage in relation to the ambient or battery temperature. (except BC1, UBC and IGBT)
- Length: 5 m



### Support



**REF 116TA6111**  
Except BC1, UBC and IGBT

### Interlock security



**REF 116TA6118**

- Automatically stops the truck when main voltage is present.
- For BC1, NG1 and NG3

### Indicator



**Shows the charging phase for on-board chargers**

- REF 116TA6113** – Remote indicator, 2,5 m  
For UBC/BC 1 (Installation hole Ø 22 mm)
- REF 116TA6115** – Remote indicator, 2 m  
For NG1/NG3/NG5/NG7/NG9 (Installation hole Ø 22 mm)
- REF 138TA7004** – Remote indicator, 4 m  
For NG1/NG3/NG5/NG7/NG9 (Installation hole Ø 22 mm)

### Kit LED extension

Displays the charging phase of the battery charger (fixing hole Ø 14 mm).

- For UBC/BC1
  - REF 152TA2739** – 500 mm
  - REF 152TA2738** – 1 m
  - REF 116TA6112** – 2,5 m
  - REF 152TA2740** – 4 m
- For NG1/NG3/NG5/NG7/NG9
  - REF 116TA6116** – 3 m



## HF MULTIVOLTAGE: IGBT/THREE-PHASE .....

### High-frequency

Ask for our FREE detailed manuals:  
**REF 123TA6868** – IGBT

Dimensions (L x B x H): 500 x 440 x 900 mm

The IGBT 2011 is the ultimate Energic Plus® charger and it is the result of 40 years of experience in design, production and customization of chargers for the material handling industry. Based on HF-IGBT technology with hybrid power conversion system, this charger offers a unique combination of performances, flexibility and electrical efficiency. The output is multivoltage, with automatic battery recognition, and completely programmable.

The new digital control board is designed to support applications of any type, and a complete set of optional tools is available to expand the functionalities of the system (wireless battery identification modules, integrated data loggers with USB port, remote control systems).



**3-year warranty**  
on all charger parts!

### General information IGBT

- **Completely automatic**, microprocessor-controlled battery charger.
- **High-frequency IGBT regulator**. Constant current, constant voltage operation, virtually zero output ripple.
- **High efficiency (> 90%)**
- **High power factor (PF > 0,85)** Power factor corrected version available (PF > 0,98)
- **User programmable charge curve**, based on IUIa system.
- **Multivoltage (12/96 V) and multicurrent (0–200 A) design**. One unit can charge batteries of any type/voltage/capacity.
- **Rugged construction**, for maximum reliability in heavy applications.
- **Digital display:**
  - Charging current (A)
  - Battery voltage (V/cell)
  - Capacity charged (Ah)
  - Time of charge (Hours-Minutes)
  - Error messages
- **Full electronic protection:**
  - Battery overvoltage
  - Battery undervoltage
  - Output fuse blown
  - Blackout of the main supply
  - Emergency timer
  - Thermal protection
  - Reverse polarity
- **Automatic equalization and maintenance** of the battery (programmable).
- **Automatic start** on battery connection and **automatic shutdown** on battery disconnection.
- **Automatic saving of the charge parameters** in case of blackout of the mains and automatic restart when the input is available.
- **Input voltage three-phase 220 V/380 V (± 15%), 50/60 Hz**. Other input voltages available on request.
- Battery voltages from 12 V to 96 V. Output currents from 40 A to 320 A
- **5-year warranty on transformer, 3-year warranty on all charger parts**
- **CE-certified**. Available: **CCSA US approved (UL+CSA)** version.
- EN50081 – 50082 - 55011
- DIN 41772 - 41774
- IEC 801/2 - 801/3 - 801/4 - 529

**HF MULTIVOLTAGE: IGBT/THREE-PHASE .....**

Model	Voltage From 12 V to ...	Current From 0 A to ...	Max battery capacity	Cable section mm <sup>2</sup>	REF
IGBT3	24 V	120 A	1050 Ah	35	<a href="#"><u>139TA2728</u></a>
IGBT4	24 V	200 A	1700 Ah	70	<a href="#"><u>140TA7501</u></a>
IGBT14	24 V	250 A	2125 Ah	95	<a href="#"><u>140TA7503</u></a>
IGBT5	36 V	120 A	1050 Ah	35	<a href="#"><u>139TA2729</u></a>
IGBT6	36 V	200 A	1700 Ah	70	<a href="#"><u>140TA7502</u></a>
IGBT15	36 V	250 A	2125 Ah	95	<a href="#"><u>140TA7504</u></a>
IGBT20	36 V	320 A	2720 Ah	95	<a href="#"><u>140TA7508</u></a>
IGBT50	36 V	500 A	4250 Ah	-	<a href="#"><u>140TA7511</u></a>
IGBT7	48 V	120 A	1050 Ah	35	<a href="#"><u>139TA2730</u></a>
IGBT11	48 V	200 A	1700 Ah	70	<a href="#"><u>139TA2731</u></a>
IGBT18	48 V	250 A	2125 Ah	95	<a href="#"><u>140TA7505</u></a>
IGBT30	48 V	320 A	2720 Ah	95	<a href="#"><u>140TA7509</u></a>
IGBT45	48 V	400 A	3400 Ah	120	<a href="#"><u>140TA7510</u></a>
IGBT55	48 V	500 A	4250 Ah	-	<a href="#"><u>140TA7512</u></a>
IGBT9	80 V	120 A	1050 Ah	35	<a href="#"><u>139TA2732</u></a>
IGBT13	80 V	200 A	1700 Ah	70	<a href="#"><u>139TA2733</u></a>
IGBT19	80 V	250 A	2125 Ah	95	<a href="#"><u>140TA7506</u></a>
IGBT40	80 V	320 A	2550 Ah	95	<a href="#"><u>139TA2734</u></a>

## SMC SERIES .....

### For lead-acid & gel batteries!

The SMC is a battery charger designed to be mounted on board in battery-powered vehicles (scissor lifts, golf carts, etc.). It has been designed for maximum reliability in wet and dusty environments. The SMC has 3 selectable charging curves (IU, IUa, IUla), suitable to charge both lead-acid and gel-cell batteries. The output current is independent from the variations of the AC-input. The exclusive power control system of the SMC ensures a high power factor, high efficiency and very low EMI\*, while the simple construction allows very easy service/maintenance operations.

\*EMI: electromagnetic interface

Dimensions (L x B x H): 310 x 230 x 190 mm



**3-year warranty**  
on all charger parts!



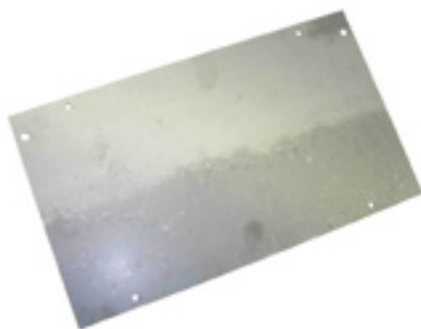
### General information SMC

- Single-phase
- High power factor
- High efficiency
- Low EMI: the SMC doesn't generate electrical noise and input current distortion
- Microprocessor-controlled battery charger
- LED control panel
- Auto-equalization system
- Maintenance system
- Charging curves: IU, IUa & IUla
- 10–12 h charge system
- Double feed of printcard (AC/DC)
- CE/UL approved
- 5-year warranty on transformer, 3-year warranty on all charger parts

**ON BOARD SMC SERIES .....**

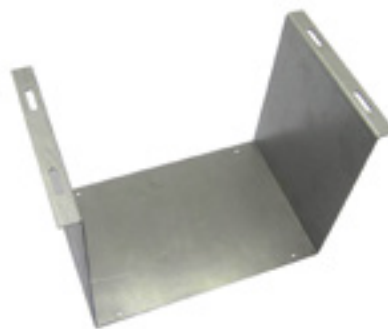
Volt	Amp	Capacity range	Input	Dimensions L x W x H	Weight	REF
12 V	30 A	166-198 Ah	110/220 VAC	300 x 180 x 190 mm	12 kg	<a href="#"><u>123TA7203</u></a>
12 V	40 A	199-263 Ah	110/220 VAC	300 x 180 x 190 mm	13 kg	<a href="#"><u>123TA7204</u></a>
24 V	20 A	100-132 Ah	110/220 VAC	300 x 180 x 190 mm	13 kg	<a href="#"><u>123TA7205</u></a>
24 V	25 A	133-165 Ah	110/220 VAC	300 x 180 x 190 mm	14 kg	<a href="#"><u>123TA7206</u></a>
24 V	30 A	166-198 Ah	110/220 VAC	300 x 180 x 190 mm	17 kg	<a href="#"><u>123TA7207</u></a>
24 V	40 A	199-263 Ah	110/220 VAC	300 x 180 x 190 mm	19 kg	<a href="#"><u>123TA7208</u></a>
24 V	15 A	96-110 Ah	110/220 VAC	300 x 180 x 190 mm	22 kg	<a href="#"><u>128TA4678</u></a>
36 V	25 A	133-165 Ah	110/220 VAC	300 x 180 x 190 mm	22 kg	<a href="#"><u>123TA7209</u></a>
36 V	30 A	166-198 Ah	110/220 VAC	300 x 180 x 190 mm	22 kg	<a href="#"><u>123TA7210</u></a>
36 V	40 A	199-263 Ah	220 VAC	330 x 200 x 260 mm	24 kg	<a href="#"><u>123TA7211</u></a>
48 V	20 A	111-132 Ah	110/220 VAC	300 x 180 x 190 mm	22 kg	<a href="#"><u>123TA7212</u></a>
48 V	30 A	166-198 Ah	220 VAC	330 x 200 x 260 mm	28 kg	<a href="#"><u>123TA7213</u></a>
48 V	40 A	199-263 Ah	220 VAC	330 x 200 x 260 mm	33 kg	<a href="#"><u>123TA7214</u></a>

**Mounting bracket**



**REF 123TA6112**  
Used on JLG E3

**Mounting bracket**



**REF 123TA6113**  
Used on JLG E450A, E450AJ, M450A, M450AJ



# ENERGIC PLUS BOOSTERS

## ENERGIC PLUS® BOOSTERS .....

### CHARACTERISTICS

- Excellent Swiss quality
- Starts any type of vehicle, from thermal lift trucks over aerial work platforms to cars
- Replaces any exhausted or missing battery

### RANGE

Select your booster depending on your fleet by means of the required peak amperage (cranking current).



Fig	Volt	Start Ampere	Peak Ampere	Maximum discharge	Car plug output 12 V	Output - fuse	Weight	Dimensions (mm)	REF
1	12 V	850 A	2500 A	10,2 kW	16 A	-	9,96 kg	370 x 310 x 160	<a href="#">147TA4369</a>
2	12 V	1170 A	3100 A	14,04 kW	16 A	500 A	12,63 kg	390 x 315 x 205	<a href="#">147TA4370</a>
3	12/24 V	2340 A – 12 V 1170 A – 24 V	6200 A – 12 V 3100 A – 24 V	28,08 kW	16 A	500 A	22,79 kg	440 x 320 x 220	<a href="#">147TA4371</a>
4	12/24 V	2400 A – 12 V 1200 A – 24 V	5400 A – 12 V 2700 A – 24 V	28,80 kW	16 A	500 A	29,11 kg	540 x 410 x 260	<a href="#">147TA4372</a>
5	12/24 V	6400 A – 12 V 3200 A – 24 V	15 500 A – 12 V 7750 A – 24 V	64,5 kW	16 A	500 A	69,80 kg	1100 x 610 x 650	<a href="#">147TA4373</a>

**REF 147TA4369**

- Volt: 12 V
- Start ampere: 850 A
- Peak ampere: 2500 A
- Maximum discharge: 10,2 kW
- Car plug output 12 V: 16 A
- Weight: 9,96 kg
- Dimensions: 370 x 310 x 160 mm

**REF 147TA4370**

- Volt: 12 V
- Start ampere: 1170 A
- Peak ampere: 3100 A
- Maximum discharge: 14,04 kW
- Car plug output 12 V: 16 A
- Output - fuse: 500 A
- Weight: 12,63 kg
- Dimensions: 390 x 315 x 205 mm

**REF 147TA4371**

- Volt: 12/24 V
- Start ampere: 2340 A – 12 V, 1170 A – 24 V
- Peak ampere: 6200 A – 12 V, 3100 A – 24 V
- Maximum discharge: 28,08 kW
- Car plug output 12 V: 16 A
- Output - fuse: 500 A
- Weight: 22,79 kg
- Dimensions: 440 x 320 x 220 mm



4

**REF 147TA4372**

- Volt: 12/24 V
- Start ampere: 2400 A – 12 V, 1200 A – 24 V
- Peak ampere: 5400 A – 12 V, 2700 A – 24 V
- Maximum discharge: 28,80 kW
- Car plug output 12 V: 16 A
- Output - fuse: 500 A
- Weight: 29,11 kg
- Dimensions: 540 x 410 x 260 mm



5

**REF 147TA4373**

- Volt: 12/24 V
- Start ampere: 6400 A – 12 V, 3200 A – 24 V
- Peak ampere: 15 500 A – 12 V, 7750 A – 24 V
- Maximum discharge: 64,5 kW
- Car plug output 12 V: 16 A
- Output - fuse: 500 A
- Weight: 69,80 kg
- Dimensions: 1100 x 610 x 650 mm



ACCESSORIES  
ACCESSORIES  
ACCESSORIES

## UNIVERSAL BATTERY CHARGER BOX .....

### PROTECT YOUR BATTERY CHARGERS

#### REF 131TA4944

#### Technical data

- Max dimensions of the battery charger (W x L x H): 620 x 620 x 945 mm
- Dimensions of the box (W x L x H): 700 x 700 x 1175 mm
- Capacity: 160 kg
- Weight: 81 kg
- Fork pocket inner dimensions (W x H): 190 x 90 mm
- Min fork spread: 310 mm

#### Features

- Suitable for transport of different sizes of battery chargers.
- The box is adjustable in height.
- Fitted onto the forks of the lift truck.
- The battery charger is secured with 2 straps, allowing the battery charger door to be opened at all times.
- The cables with electrical plug are safely stored underneath the battery charger.
- Can be stacked up to 3 rows high.

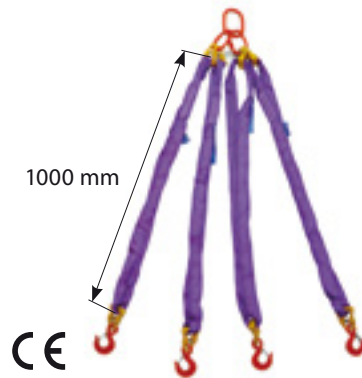


# BATTERY ACCESSORIES .....

## LIFTING HARNESS

**REF 106TA8839**

- For traction batteries
- 4 hooks
- 1500 kg capacity/top hook 120°
- 2000 kg capacity/top hook 90°



**Eye hook with safety latch**

REF **131TA6988**

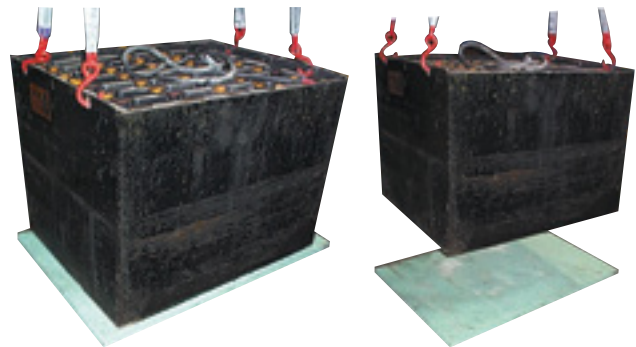
**Clamp**

REF **116TA5784**  
Clamp to lift traction cells

## PROTECTIVE MAT

**REF 115TA5411**

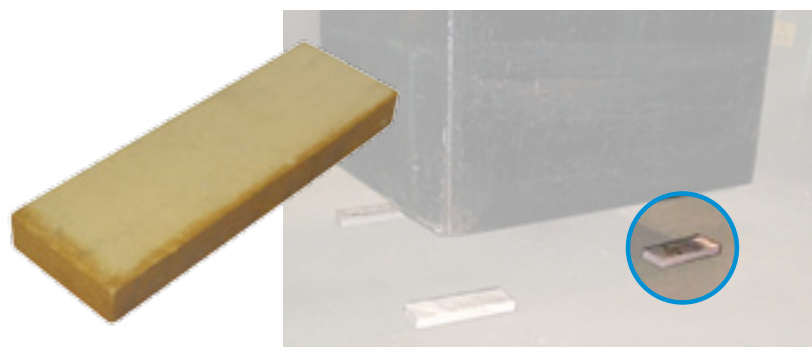
- Protective mat for traction batteries
- Protects the floor from damage and pollution
- Protects the battery against severe shocks
- Dimensions: 800 x 1200 x 2 mm



## PROTECTIVE MOUNTINGS

**REF 115TA5412**

- Protects the floor from damage and pollution
- Protects the battery against severe shocks
- Can be fitted in the lift truck compartment
- Dimensions: 252 x 80 x 25 mm



## BATTERY PAINT FOR BOX

**REF 106TA8933**

- Black battery paint
- 0,5 l

**REF 106TA8932**

- Black battery paint
- 5 l



## BATTERY ACCESSORIES .....

### BATTERY PROTECTION SPRAY

#### REF 107TA7662

- With acid indicator
- Eliminates and prevents corrosion
- Turns pink in the presence of acid
- 400 ml

Curious about more products for battery maintenance?  
Contact your sales advisor.



**TOTAL SOURCE®**

### ABSORBING SOCKS

#### REF 106TA9009

- 76 x 1220 mm
- 12 pieces/box
- **Absorbs acid!**



### SPILL KIT FOR CHEMICALS

#### REF 124TA1742

##### Contents:

- Lockable container with handle and 2 wheels
- 25 absorbing towels: 390 x 500 mm
- Absorbing socks: 70 x 1500 mm
- Absorbing socks: 70 x 3000 mm
- 1 pair of safety goggles
- 1 pair of gloves
- 1 dammit seal kit: 500 g
- 1 absorbing cushion: 400 x 520 mm



### NEUTRAL PLUS+

#### REF 152TA2059

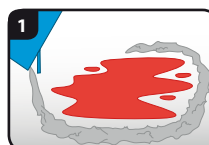
- Content: 2,3 kg
- Advanced spill-absorbing powder with acid neutraliser

##### For:

- Industrial battery acid spills
- Hydraulic and motor oils
- Solvents and paints

##### Precautions:

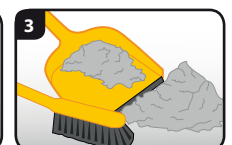
**Do not use on hydrofluoric acid**



1 Surround spill with Neutral Plus powder



2 Sweep powder into the spill



3 Dispose of powder, repeat as needed

## BATTERY ACCESSORIES .....

### ACID EATER - BATTERY STATION CLEANING KIT

**REF 124TA1734**

- Kit contains everything needed to clean forklift batteries
- Neutralizes and cleans batteries, stands, rollers, forklifts, battery compartments and concrete floors
- Eliminates trickle discharge to ensure optimum performance
- Minimizes safety risks by eliminating acid burns and shock
- pH color indicators alert users of acidic corrosion
- Easy to apply and safe to use on metal, plastic and rubber
- Durable kit can withstand any environment



**Accessories:**

**REF 124TA1735** – Acid eater neutralizer and degreaser

**REF 124TA1736** – Acid-resistant PVC apron

**REF 124TA1737** – Haz Mat boot covers

**REF 124TA1738** – Acid-resistant goggles

**REF 124TA1739** – Acid-resistant gloves

**REF 124TA1740** – Utility brush

### BRUSH CLEANING SET

**REF 106TA8985**



### BATTERY BRUSH (TO BE FITTED ON A DRILL)

**REF 152TA2060**

- Diameter: 51 mm
- For standard 18 mm battery terminals



### ANTI-CORROSION BATTERY GREASE

**REF 106TA8991**

- Tube of anti-corrosive grease for battery terminals
- 20 ml



## BATTERY ACCESSORIES .....

### BATTERY TERMINAL PULLER

**REF 145TA8756**

- Max width: 60 mm
- Max height: 40 mm
- Weight: 225 g



### BATTERY TERMINAL SPREADER & CLEANER

**REF 145TA2215**

- Sharp milled teeth for effective cleaning
- Die-cast construction with vinyl grips
- OAL: 7" (178 mm)



### MANUAL POLE AND TERMINAL REAMER

**REF 145TA2211**



### BATTERY DRILL BIT (TO BE FITTED ON A DRILL)

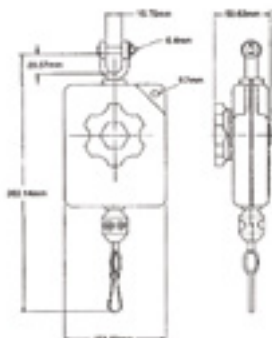
**REF 106TA8984**

Diameter: 19 mm



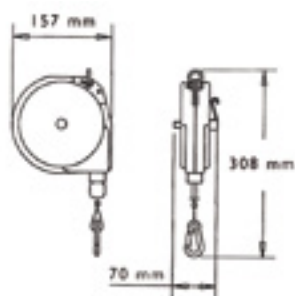
## STANDARD-DUTY BALANCERS 0,5–1,8 KG.....

- Prevents damage to connectors
- Long-life heavy-duty spring for lasting performance
- Easy tension adjustment with no tools required
- Full range of motion with 360° swivel hanger
- Quick installation
- Durable nylon cable for long life and reduced maintenance
- Convenient snap-type tool clip for easy tool handling
- Alignment of hanger and tool hook for smooth, efficient use

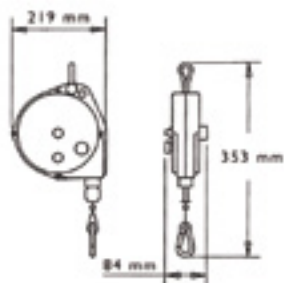


Weight	Cable travel	REF
0,5–0,9 kg	2 m	<a href="#"><u>115TA7048</u></a>
0,9–1,8 kg	2 m	<a href="#"><u>115TA7049</u></a>

## HEAVY-DUTY BALANCERS 0,5–6,8 KG.....



Ratchet lock	Weight	Cable travel	REF
NO	0,5–2,3 kg	2,4 m	<a href="#"><u>115TA7050</u></a>
YES	0,5–2,3 kg	2,4 m	<a href="#"><u>115TA7051</u></a>



Ratchet lock	Weight	Cable travel	REF
NO	1,8–4,5 kg	2,4 m	<a href="#"><u>115TA7052</u></a>
YES	1,8–4,5 kg	2,4 m	<a href="#"><u>115TA7053</u></a>
NO	3,6–6,8 kg	2,4 m	<a href="#"><u>115TA7054</u></a>
YES	3,6–6,8 kg	2,4 m	<a href="#"><u>115TA7055</u></a>



- Easy tension adjustment, no special tools required
- Heavy-duty steel construction for long life
- Easy spring replacement
- Long lasting main spring designed to minimize spring flexing and fatigue
- Tool can be set in desired position with adjustable cable stop
- Durable 2,5 mm diameter stranded steel aircraft cable
- Ratchet lock holds cable in desired position

## CONNECTOR SAVER .....

The connector saver offers a simple and inexpensive solution to a problem common to all users of electric trucks.

### Potential problem:

Inadvertent damage to connectors and cabling results in high cost repairs and replacements. Damaged cable is a fire and safety hazard.

### Answer:

This is the only solution that retracts the cable safely whilst at the same time ensuring that there is virtually no tension on the battery connection during the charging operation.

The complete kit with installation instructions includes: cable balance – cable clamp – wall bracket and fixings (several types available).



Pull back force	Cable length	REF
1,8 kg	1600 mm	<a href="#">107TA1017</a>
2,7 kg	2000 mm	<a href="#">107TA1018</a>
3,6 kg	2000 mm	<a href="#">107TA1019</a>
4,5 kg	2400 mm	<a href="#">107TA1020</a>
6,8 kg	2400 mm	<a href="#">107TA1021</a>

1,8 or 2,7 kg pull back force is adequate for most applications



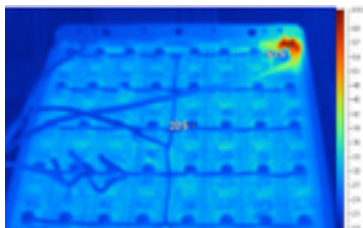
## FLUKE TIS10 / THERMAL IMAGER .....

### REF 147TA5767

- Size (H x W x D): 267 x 101 x 145 mm
- Weight: 0,720 kg
- Warranty: 2-years

### Features

- Built for performance with features that help you easily and quickly identify problems before they become expensive failures
- Higher efficiency of the battery
- Used to analyze chargers



Thermal image was taken on an 80 V battery where – after thermal analysis – it turned out that **a bad connector on this battery was the cause of the battery failure.**



Via the free supplied software it has become clear that the average battery temperature was 22 °C, and that this temperature climbed to 62 °C in the vicinity of the bad connector. A temperature difference is not possible within one and the same battery, so this must be repaired.

### Included accessories

AC power adapter, lithium ion smart battery, USB cable, soft transport bag, quick reference guide and safety sheet. Software is available via download at [www.fluke.com/smartviewdownload](http://www.fluke.com/smartviewdownload)

### Recommended accessories



**FLK-TI-SBP3**  
**REF 140TA8977**  
Extra rechargeable battery



**TI-CAR CHARGER**  
**REF 140TA8978**  
Vehicle charger



**FLK-TI-SBC3**  
**REF 140TA8976**  
Charging base

Fluke connect™ works with WIFI and some countries require special WIFI radio compliance certification.

Countries with WIFI – radio license: Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States

Please contact us if your country is not listed above.



**REF 29793487**  
More test tools in our 'Fluke test tools' catalogue: go to downloads on [www.tvh.com](http://www.tvh.com) or order your free copy.

## BATTERY TESTING EQUIPMENT .....

### FLUKE VT04/VISUAL IR-THERMOMETER

#### REF 141TA7634

- Battery life: 8 hours
- Size (H x W x D): 210 x 75 x 55 mm
- Weight: 0,35 kg
- Warranty: 2 years

#### See beyond temperature!

The VT04 is as convenient as a spot thermometer, insightful as a thermal imager, with the visual context of a digital camera. It combines the convenience of a spot thermometer with the visual advantage of a thermal imager creating a brand new tool category – a troubleshooting camera with infrared heat map. You can detect and capture issues instantaneously with digital and thermal blended images, pinpoint hot and cold spots with temperature markers. Also Hi/Lo temperature alarm and automatically capture images after a userselected temperature alarm has been triggered.

Document problems efficiently with SmartView<sup>®</sup> professional reporting software! (see pag. 34) The VT04 is the missing link – the ultimate in between tool for those times when a single spot temperature reading isn't enough and a highresolution thermal image is more than you need, or can afford.

#### Included accessories

Hard Case, hand strap, Micro-SD card and adapter, SmartView<sup>®</sup> software on CD, Lithium Ion batteries and Micro USB Charger/Power Supply, Printed Quick Start Guide in English, Spanish, German, French and Simplified Chinese Simplified, others on CD. Users manual on CD (21 languages).

#### Recommended accessories



#### VT04-BATTERY

##### REF 141TA7681

Extra rechargeable battery for VT04



#### VT04-CHARGER

##### REF 141TA7683

Extra charger and adapters for VT04



#### REF 29793487

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## BATTERY TESTING EQUIPMENT .....

### FLUKE 500 SERIES/BATTERY ANALYSERS

**Reduced testing complexity, a simplified workflow and an intuitive user interface provide a new level of ease-of-use in battery testing.**

- The ideal test tool for maintenance, troubleshooting and performance testing of individual stationary batteries and battery banks used in critical battery back-up applications
- The intuitive user interface, compact design and rugged construction ensure optimum performance, test results and reliability
- Covers a broad range of battery test functions ranging from DC voltage and resistance tests to full condition testing using automated string function testing and the test probe integrated infra-red temperature measurement system
- Designed for measurements on stationary batteries of all types.

#### Fluke BT510 key features:

- **Battery voltage** – during the internal resistance test, Fluke battery analyzers also measure the voltage of the battery under test
- **Discharge volts** – the discharge mode collects the voltage of each battery multiple times at a user defined interval during a discharge or load test. Users can calculate the time a battery takes to drop to the cut-off voltage and use this time to determine the capacity loss of the battery
- **Ripple voltage test** – measures unwanted residual AC component of the rectified voltage in dc charging and inverter circuits. Allows users to test AC components in DC charging circuits and find one of the root causes of battery deterioration
- **Meter and sequence modes** – the meter mode is used for a quick test or troubleshooting. In this mode you can save and read the readings in a measurement or time sequence. The sequence mode is for maintenance tasks with multiple power systems and battery strings. Before a task starts, users can configure a profile for the task for data management and report generation
- **Threshold and warning** – users can configure a maximum of 10 sets of thresholds and receive a pass/warning/fail indication after each measurement
- **Intercell strap resistance test and data management** – Measures the resistance of the intercell connection between batteries in a string. Once the measurements are completed Fluke Battery Management Software version 1.0.69 can now report the strap resistance for a battery string or historical data over time.
- **AutoHold** – when AutoHold is turned on, a reading is captured when it remains stable for 1 second. The reading is then released when a new measurement starts
- **AutoSave** – when AutoSave is turned on, measured values are saved to internal memory automatically after an AutoHold reading is captured
- **Fluke Battery Management Software** – easily import data from the product to a PC. The measurement data and battery profile information is stored and archived with the Management Software and can be used for comparison and trend analysis. All measurement data, battery profile and analysis information can be used to easily generate reports
- **Comprehensive logging** – all measured values are automatically captured during testing and can be reviewed on the instrument before downloading for on-the-go analysis



FLUKE®

- **Optimized user interface** – quick, guided setup ensures you're capturing the right data every time
- **Battery life** – 7.4 V 3000 mAh lithium-ion battery for more than eight hours continuous operation.
- **USB port** – for fast data download to supplied data analysis and report management application software.
- **Highest safety rating in the industry** – CAT III 600 V, 1000 V DC max rated for safe measurements all around the battery power supply equipment.

**Fluke BT520 Key features:** (designed for measuring batteries in cabinets and hard to reach places)

- BTL20 Interactive Test Probe set, with long and short probe extenders and built-in LCD display and speaker for visual and audio feedback
- Large soft carry case
- All of the above plus

**Fluke BT521 Key features:** (designed for users who need to incorporate temperature measuring)

- BTL21 Intelligent Test Probes with long and short extenders, built-in LCD display and speaker for visual and audio feedback and integrated infrared temperature sensor for taking temperature measurements on the negative battery post with every test
- Wireless capability works with Fluke Battery Analyze mobile app (Fluke BA Mobile)\*
- View profile and associated test results from the Battery Analyzer
- Send out the profile and test results via email with (.csv) data format

\* BTL20 not included with the Fluke BT-521. Not currently compatible with Fluke Connect™ app

## BATTERY TESTING EQUIPMENT .....

### FLUKE 500 SERIES

#### Voltage and resistance thresholds

Fluke Battery Analyzers allow you to quickly and easily define upper and lower measurement thresholds or tolerance ranges. During the testing process, measured values are automatically compared to the predefined threshold levels producing a PASS, FAIL or WARN indication after each measurement. A maximum of 10 sets of thresholds can be stored. Threshold indications are determined based on the following criterion:

#### Fluke Battery Management Software

Fluke Battery Management Software easily allows you to quickly and easily import data from the battery analyzer to a PC. The measurement data and battery profile information is stored and archived with the management software and can be used to compare results, switch results between conductance and resistance readings and perform trend analysis. All measurement data, battery profile and analysis information can be used to easily generate reports.

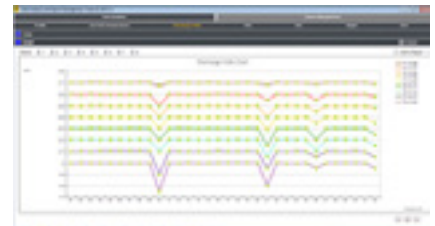
- Quick view saved readings
- Profile management
- Histogram of a battery string with end user defined threshold
- Historical trend data of batteries
- Multiple rounds of discharge voltage
- Quick report generation
- Upgrade Fluke Battery Analyzer firmware
- Switch measurement results between conductance and resistance readings



Histogram of a battery string with user defined threshold



Historical trend data of batteries



Multiple rounds of discharge voltage

#### Fluke Battery Analyze mobile app

The BT521 offers wireless communication for data download and remote display while measuring via the dedicated Fluke Battery Analyzer mobile app (note: the Fluke BT521 is not currently Fluke Connect compatible). Using the Fluke Battery Analyze mobile app you can:

- Browse profile
- Review sequence testing data
- E-mail sequence testing data



**Download the Fluke Battery Analyze Mobile App**

# BATTERY TESTING EQUIPMENT .....

## FLUKE 500 SERIES

	BT510 REF 145TA8977	BT520 REF 145TA8996	BT521 REF 145TA8979
Battery analyzer	√	√	√
4-wire test pin (set)	√	√	√
BTL10 Basic Test Lead (set)	√	√	√
TL175 TwistGuard™ Test Leads with adapter	√	√	√
BTL20 Intelligent Test Probe Set, with extender (no temperature sensor)	–	√	–
BTL21 Intelligent Test Probe Set, with extender and temperature sensor	–	–	√
i410 AC/DC Current Clamp	–	–	√
BP500 lithium-ion battery	√	√	√
BC500 AC charger	√	√	√
Mini-USB cable	√	√	√
Shoulder strap	√	√	√
Belt strap	√	√	√
Magnetic hanging strap	√	√	√
FlukeView® Battery Management Software	√	√	√
Soft carrying case	√	√	√
Spare fuses (2)	√	√	√
Battery tags	–	√	√
Zero Ohm Calibration Resistor	√	√	√

**REF 29793487**

More test tools in our 'Fluke test tools' catalogue: go to downloads on [www.tvh.com](http://www.tvh.com) or order your free copy.



# BATTERY TESTING EQUIPMENT .....

## FLUKE 375 FC / TRUE-RMS AC/DC CLAMP METER

**REF 151TA2265**

- Size (H x W x D): 249 x 85 x 45 mm
- Weight: 0,395 kg
- Warranty: 3-years

**Included accessories**

Soft carrying case, TL75 test leads, AA-batteries, coated instruction card, safety information sheet

**Recommended accessories**



**i2500-18 inch iFlex (45 cm)**  
REF [138TA3972](#)  
Flexible current probe



**TL223-1**  
REF [140TA7507](#)



**AC285**  
REF [131TA8467](#)



**TPAK**  
REF [131TA8446](#)



### High-performance clamp meter with wireless communication and logging capabilities.

The 375 FC true-rms clamp meter is compatible with the Fluke iFlex flexible current probe (sold separately), which expands the measurement range to 2500 A ac. The Fluke 375 FC is also part of the Fluke Connect® family of wireless test tools.

**Now you can:**

- Log and trend measurements to pinpoint intermittent faults.
- Transmit results wirelessly via Fluke Connect® Measurements app.
- Create and send reports right from the field.
- Stay safely away from the arc flash zone through Bluetooth connectivity to Apple and Android devices.

**Features**

True RMS	√
Backlight	√
Auto ShutOff	√
Display Hold	√
Low pass filter	√
Inrush	√
Large jaw (34 mm)	√
Current AC/DC	√
Min, max, average, and inrush measurements	√
Logging	√
Fluke Connect®	√

### Specifications

Functions	Range	Resolution	Accuracy
AC Current via jaw	600 A	0,1 A	2% ±5 digits
			2,5% ±5 digits
AC Current via Flexible Current Probe	2500 A	0,1 A (≤ 600 A)	3% ±5 digits
		1 A (≤ 2500 A)	
DC Current	600 A	0,1 A	2% ±5 digits
AC Voltage	1000 V	0,1 V (≤ 600 V)	1,5% ±5 digits
		1 V (≤ 1000 V)	
DC Voltage	1000 V	0,1 V (≤ 600 V)	1% ±5 digits
		1 V (≤ 1000 V)	
mV DC	500 mV	0,1 mV	1% ±5 digits
Frequency via Jaw	5 Hz to 500 Hz	0,1 Hz	0,5% ±5 digits
Frequency via Flexible Current Probe	5 Hz to 500 Hz	0,1 Hz	0,5% ±5 digits
Resistance	60 kΩ	0,1 Ω (≤600 Ω)	1% ±5 digits
		1 Ω (≤6000 Ω)	
		10 Ω (≤60 kΩ)	
Capacitance	1000 μF	0,1 μF (≤ 100 μF)	1% ±4 digits
		1 μ F (≤ 1000 μF)	

## ACCESSORIES.....

### SMARTBLINKY

#### Let your batteries tell you when they're thirsty

**Problem:**

Batteries may sustain damage if the electrolyte level is too low

**Solution:**

SmartBlinky alerts and reminds you when it is time to top up your batteries



### ADVANTAGES

**Saves money**

- Low investment cost, helps to prevent costly battery replacement
- Prolongs battery life: never lets a battery dry out

**Saves time**

- Reduces labor time wasted by checking battery levels
- Advanced technology eliminates false indications, maximizes watering intervals

**Easy maintenance**

- Allows you to quickly detect the machines of which the batteries need water

**Helps to protect your battery**

- SmartBlinky informs you when the electrolyte level drops below a set level

**Easy to use**

- Produces bright clear signals
- Variety of options to meet your needs

**Safest electrolyte level monitor on the market**

- Low voltage (4 V nominal)
- Fuse-protected
- Low current draw
- Internationally certified

**Durable design**

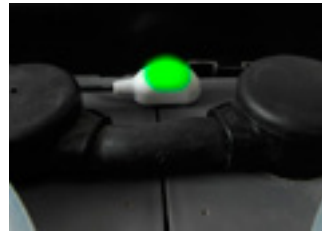
- Built to withstand the harsh industrial battery applications

# ACCESSORIES.....

## BLINKY

**REF 151TA2998**

- LED blinks green when electrolyte is OK
- LED goes out when water is needed
- Reverse polarity protected
- Translucent overmold super bright LED
- Low-cost solution for electrolyte monitoring



## SMARTBLINKY CYCLOPS

**REF 144TA5920**

- Ideal for batteries that don't leave the truck
- LED is mounted in a rugged connector which is located behind the battery connector
- Whenever battery is disconnected from the charger, LED is in the operatives hand so the warning signal can't be missed



## SMARTBLINKY

**REF 151TA2272**

- LED blinks green when electrolyte is OK
- LED blinks red when water is needed
- Super bright LED
- Eliminates false indication and maximizes watering intervals to prevent unnecessary watering
- 5-day delay option



## SMARTBLINKY PRO

**REF 151TA2273**

- Intelligent battery monitoring system with light and sound
- SmartBlinky Pro produces an audible alarm that alerts you even when you can't see the battery. The signal informs you if a battery needs watering and the variable frequency even tells you how long the electrolyte level has been low
- Brightest light indication on the market
- Revolutionary ease of installation
- SmartBlinky Pro indication to avoid boil over



## ACCESSORIES.....

### DISTILLED WATER STATION

**‘Make buying distilled water a thing of the past’**

**REF 127TA3874**

The HydroPure is a low cost deionizer system that allows you to make pure water straight from the tap!  
This deioniser reduces the high price of buying bottled water and it's more convenient as well. Each disposable cartridge purifies about 2400 l of water and the purity light will tell you exactly when the cartridge is used up.

**REF 127TA3874** – HydroPure 300: complete deioniser system supplied with DC battery-powered purity light and 1 replaceable cartridge (installed)

**REF 127TA3875** – Replacement deioniser cartridge for 300/400

**Specifications:**

- **Professional quality deionizers:** Not just a filter, which only removes particles, but a real ion-exchange medium which electrostatically removes dissolved impurities. Purity is comparable with distilled water and ideal for batteries.
- **Large capacity:** The cartridge is rated for 2400 l of pure water.\*
- **Purity light:** This "magic eye" monitors the conductivity of the output water continuously and signals when it is time to change the cartridge.
- **Pressurized system, easy installation, easy cartridge replacement.**

Flow rates	
Maximum intermittent flow	8 l/min
Maximum continuous flow	2 l/min
Output	
Maximum output (input purity 50 ppm)	5760 l
Typical output (input purity 120 ppm)	2400 l
Poor water output (input purity 250 ppm)	1150 l
Maximum input pressure	80 psi
Cartridge resin volume	4,5 l
Indication	
Purity light indication water OK	Steady green flash
Purity light indication water BAD	Double red flash
Purity light OK max threshold	50 ppm

\* Only under typical circumstances with an input purity of 120 ppm.



## SAFETY PRODUCTS .....

### EYEWASHING BOTTLES – STERILE SOLUTION FOR EYE WASH

- REF [134TA8688](#) – 100 ml ampul  
 REF [134TA8689](#) – 250 ml ampul  
 REF [134TA8690](#) – 500 ml bottle



CE

### EMPTY EYEWASH BOTTLE

- REF [106TA9006](#) – 400 ml  
 REF [106TA9007](#) – 800 ml



CE

Support

REF [106TA9008](#)

### FIRST-AID KIT – SPLINTER REMOVAL KIT

REF [106TA9004](#)
**Contents:**

- Professional removal pencil
- 1 mirror
- 1 magnifying glass
- 1 sterile eyewash solution 100 ml
- 1 eye glass
- 1 stainless steel s/s tweezers 11,5 cm
- 2 sterile gauze pads 18 x 40 cm



CE

### EYE CARE AND SPLINTER REMOVAL KIT

REF [106TA9005](#)
**Contents:**

- 1 magnifying glass
- 1 eyewash bottle with sterile solution (500 ml)
- 1 magnetic stick
- 5 sterile eye pads with conforming bandage loop
- 1 metal tweezers, 12 cm long
- 1 plaster 100 x 6 cm
- 1 pair of metal scissors, 10 cm long, with plastic handles
- 3 packets of disposable paper wipes



CE

## SAFETY PRODUCTS .....

### FIRST-AID KIT EURO

#### REF 140TA8638

Small first-aid kit which is useful for cars, trekking, camping, boy scout, ...

#### Contents:

- 1 triangular bandage TNT 96 x 96 x 136 cm
- 2 adhesive plasters 10 x 6 cm
- 1 pair of scissors 10 cm
- 1 plastic tweezers
- 1 cotton wool pack 20 g
- 1 pack of 10 assorted adhesive plasters
- 2 gauze bandages 7 cm
- 1 adhesive plaster roll 5 x 2,5 cm
- 1 pair of gloves
- 2 packs of sterile TNT pads 1 x 1 cm
- 1 PIC
- 3 packs of 8 ass sachets soap/disinfectant/ammonium
- 1 instant ice pack
- Guidance leaflet 5 languages



CE

### FIRST-AID KIT

#### REF 140TA8668

Made of strong tripolymer plastic which is shiny, smooth and easy to clean. A neoprene seal is fitted to make the kit dustproof. A wall bracket secures the kit on any wall. A better contents settlement is permitted by the internal crystal partitions. The closing security is given by two swivel catches.

#### Contents:

- 1 ministerial decret copy 388 of the 15/07/03
- 2 pair of sterile gloves
- 1 jodopovidone disinfectant solution at 10% 125 ml
- 1 saline solution 250 ml CE
- 3 sterile gauze 18 x 40 cm sachets
- 1 pack of cotton
- 3 sterile gauze 100 x 100 mm sachets
- 1 plastosan 20 assorted dressings
- 1 sterile tweezers
- 1 adhesive plaster 5 x 2,5 cm
- 2 gauze bandages 10 cm x 3,50 m
- 1 lister pair of scissors 14,5 cm DIN 58279
- 1 tourniquet
- 1 instant ice pack
- 1 sanitary bag
- 1 triangular TNT bandage: 96 x 96 x 136 cm
- 1 isothermic blanket gold/silver 160 x 210 cm
- 1 pack of 8 ass sachets soap/disinfectant/ammonium
- 2 compressive bandages 8 x 10 cm DIN 13151
- 2 x burn gel sachet: 3,5 g
- 1 sterile bandage 40 x 60 cm DIN 13152BR
- 1 multilingual first aid booklet



## SAFETY PRODUCTS .....

### REUSABLE MASKS

Size	Weight	Width x height	REF
M	113 g	152,6 x 190,7 mm	<a href="#">143TA7047</a>
L	140 g	161,0 x 204,1 mm	<a href="#">143TA7048</a>

Optimal breathing comfort for long-term work using a full face mask

- Silicone body and ergonomic design for optimum fit
- Wide field of vision through the panoramic screen
- Click-fit cartridge fastening system

#### Areas of application:

- Laboratories, pharmaceutical industry: exposure to aerosols containing bacteria or viruses, handling powders creating a risk for skin and eyes, working in clean rooms
- Oil and gas industry: handling chemicals where there is a risk of splashes (gas detection), chemical sampling
- Mechanical industry, automotive industry: application of paints and solvents with a risk for skin and eyes
- Chemical industry: manufacture of paints, solvents, high risk products



#### Technical description:

- Body: silicone
- Eyepiece: polycarbonate
- Harness: adjustable five-point harness
- Speech diaphragm: integrated (plastic)
- Twin filter system: "Click-fit" fasteners
- Wearing corrective lenses: possible
- Standard: EN 136

#### Filters (not included):

**REF 143TA7044** – A2P3

**REF 143TA7045** – ABEK1P3

**Honeywell**

### GOGGLES

#### REF 106TA9013

- Fullview goggle with soft PVC frame
- Protects against impacts from flying particles of low energy, liquid droplets, mist, crop spray and fine dust, all in accordance with cited standards
- Worn over most safety spectacles or over most prescription glasses

#### Standard:

- EN 166 1F CE



**Honeywell**

### SLEEVES

#### REF 124TA1730

- Forearm protection
- Chemical-resistant
- Green PVC
- Length: 381 mm



CE

## SAFETY PRODUCTS .....

### ACID RESISTANT APRON

#### REF 144TA1727

- Type PB[4] (partial Body) apron designed to be used for maintenance, industrial, cleaning and handling
- Apron with adjustable lace - 400 g/m<sup>2</sup>
- Dimensions: 1210 x 910 mm
- Color: green
- Unisex



### ACID-RESISTANT JACKET AND TROUSERS



#### REF 140TA8672

- EN 14605 – Type 4
- Jacket: 100% waterproof, windproof, strong, supple, high-frequency welded seams, different linings, fleeces can be zipped in
- Outside: fixed hood, raglan sleeves, elasticized wind cuffs within sleeve, unlined, 2 inset pockets, zip closure under double flap with touch and close fastening
- Fabric: Chemflex: 100% polyester knitting with PVC/PU coating; ± 390 g/m<sup>2</sup>
- Acid-resistant
- Colour: green

#### REF 140TA8673

- EN 14605 – Type 4
- Trousers: 100% waterproof, windproof, strong, supple, high-frequency welded seams
- Outside: elasticized waist, leg narrowing by flap and touch and close fastening, reinforced knees, unlined
- Fabric: Chemflex: 100% polyester knitting with PVC/PU coating; ± 390 g/m<sup>2</sup>
- Acid-resistant
- Colour: green

CE

## SAFETY PRODUCTS .....

### GLOVES

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REF **143TA7021** – Size: 7

REF **143TA7022** – Size: 8

REF **143TA7023** – Size: 9

REF **143TA7024** – Size: 10

**Recommendations:**

High-performance chemical protection (oils, detergents, certain solvents)

**Applications:**

- Degreasing of metals (solvents) in the automotive and aeronautic industry
- Machining of parts in the presence of cutting oils
- Manufacturing and application of paints and varnishes
- Cleaning of printing rolls

**Advantages:**

The nitrile formulation was chosen for its mechanical resistance, its flexibility, and its resistance to a great number of chemical products

**Standard:**

- Cat III
- EN 420
- EN 388:4101
- EN 374-3:JKL



**Honeywell**

A series of horizontal dotted lines for writing, spanning the width of the page.



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